

# BUSINESS 1A

## BUSINESS J

### *Corporate Governance*

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- ◆ Rights, Duties, Responsibilities, and Authority of the Board of Directors, Officers, and Other Employees
  - ◆ Sarbanes-Oxley Act of 2002
    - ◆ Internal Control
  - ◆ Enterprise Risk Management
    - ◆ Change Control Process

## **NOTES**

**SUMMARY NOTES****I. RIGHTS, DUTIES, RESPONSIBILITIES, AND AUTHORITY OF THE BOARD OF DIRECTORS, OFFICERS, AND OTHER EMPLOYEES****A. Board of Directors**

Among the specific duties of directors are the election, removal, and supervision of officers; adoption, amendment, and repeal of bylaws; setting management compensation; initiating fundamental changes to the corporation's structure; and declaration of distributions to owners. Another critical role of the board is to manage any potential conflict of interest that may exist between the shareholders (principal) and senior management (agent). Directors are fiduciaries of the corporation and must always act in the best interests of the corporation.

**B. Officers**

Officers are corporate agents. Officers are fiduciaries of the corporation and must act in the best interests of the corporation. Officers may serve on the board of directors and are not required to be shareholders.

**II. SARBANES-OXLEY ACT OF 2002**

The financial reporting issues associated with corporate governance generally relate to the provisions of the Sarbanes-Oxley Act of 2002 (also called SOX). SOX has numerous provisions for expanded disclosures and specific representations by management that are described in the first two major titles.

**A. Title III—Corporate Responsibility**

1. Public companies (also known as issuers) must have an audit committee.
2. The audit committee comprises board members who are independent of the company other than their membership on the board of directors. To be independent, an audit committee member cannot be a paid consultant or advisor.
3. The external auditor reports to the audit committee.
4. The Chief Executive Officer (CEO) and the Chief Financial Officer (CFO) are required to sign off on published reports and represent that the report:
  - a. was reviewed by each party.
  - b. does not contain untrue statements or material omissions.
  - c. contains financial statements that present fairly in all material respects the financial condition and results of operations of the issuer.
5. The CEO and CFO are required to represent that they are responsible for internal controls and that the controls are designed to ensure that all material information has been made available to the auditors, and that controls have been evaluated for effectiveness.
6. The CEO and CFO must represent whether there have been any significant changes to internal control.
7. If the CEO or CFO falsify information about the financial statements, potential penalties include repaying the issuer any bonuses that are equity based or repaying any gains that were realized on the sale of the issuer's stock.

**B. Title IV—Enhanced Financial Disclosures**

1. Management must include the following enhanced disclosures in its periodic reports.
  - a. Material correcting adjustments identified by the auditor should be reflected in the financial statements.
  - b. Disclosure of all material off-balance sheet transactions.
  - c. Conformity of pro forma financial statements to certain requirements (no untrue statements or omitted material information; reconciled with GAAP financial statements).
  - d. The use of special purpose entities (SPEs).
2. Disclose any parties that have a direct or indirect ownership of more than 10 percent of any class of most equity securities.
3. Management must assess the organization's internal controls and make disclosure of that assessment.
4. An issuer must disclose whether or not its senior officers have adopted a code of ethics (conduct). If not adopted, the issuer must explain the reasons.
5. Audit committees must have a financial expert.
  - a. The financial expert is an individual who has expertise developed through education or experience as an auditor or finance officer for an organization of similar complexity.
  - b. The financial expert must be disclosed.

**C. Title VIII—Corporate and Criminal Fraud Accountability**

1. An individual who alters, destroys, conceals, or makes false entries in any record or document with the intent to impede, obstruct, or influence an investigation, will be fined, imprisoned not more than 20 years, or both.
2. Auditors of issuers should retain all audit and review workpapers for a period of seven years from the end of the fiscal period in which the audit or review was conducted. Failure to do so will result in a fine, imprisonment for not more than 10 years, or both.
3. The statute of limitations for securities fraud is no later than the earlier of two years after the discovery of the facts constituting the violation or five years after the violation.
4. An employee who lawfully provides evidence of fraud may not be discharged, demoted, suspended, threatened, harassed, or in any other manner discriminated against for providing such information.
5. An individual who knowingly executes, or attempts to execute, securities fraud will be fined, imprisoned not more than 25 years, or both.

**D. Title IX—White-Collar Crime Penalty Enhancements**

1. An individual who attempts or conspires to commit any white-collar offense will be subject to the penalties as predetermined by the United States Sentencing Commission.
2. When an issuer files a periodic report with the SEC that contains financial statements, it must include the following *written* statements (signatures):
  - a. The report fully complies with Securities Exchange Act of 1934.
  - b. The information contained in the report fairly presents, in all material respects, the financial condition and operating results of the issuer.
  - c. The above written statements must be signed by the chief executive officer and chief financial officer (or their equivalent) of the issuer, who bear full responsibility for these written statements.

3. When a party of the issuer certifies a financial report and/or its contents, knowing that it does not satisfy all three requirements above, he or she will be subject to fines or imprisonment.

**E. Title XI—Corporate Fraud Accountability**

1. An individual who alters the integrity of, destroys, or conceals a document used in connection with an official proceeding shall be fined and/or subject to not more than a 20-year prison term.
2. As part of cease-and-desist proceedings, the SEC may issue an order that prohibits a person from serving as an officer or director of an issuer, in the event the SEC determines that the person has violated securities rules/regulations and is unfit to continue to serve the issuer in that capacity.
3. An individual who knowingly retaliates against a person who provides truthful information to the SEC in connection with a possible federal offense shall be fined or imprisoned for not more than 10 years.

**III. INTERNAL CONTROL**

The Committee on Sponsoring Organizations (COSO) issued *Internal Control—Integrated Framework* (the *Framework*) to assist organizations in developing comprehensive assessments of internal control effectiveness. The COSO's framework is widely regarded as an appropriate and comprehensive basis to document the assessment of internal controls over financial reporting.

**A. COSO Framework Objectives**

There are three categories of objectives built within the framework:

1. *Operating objectives* pertain to the effectiveness and efficiency of an entity's operations.
2. *Reporting objectives* relate to the reliability, timeliness, and transparency of an entity's external and internal financial and nonfinancial reporting.
3. *Compliance objectives* are developed to ensure the entity is adhering to existing laws and regulations.

**B. COSO Framework**

The COSO framework is comprised of five integrated components that logically begin with the tone at the top and conclude with monitoring the effectiveness of internal controls. There are 17 principles that support these 5 components. The mnemonic "**CRIME**" is used to remember these 5 components.

**1. Control Environment**

- a. Referred to as the "tone at the top."
- b. Ethics, board oversight, commitment to employee competencies, and organizational structure are the foundational principles that define this component.

**2. Risk Assessment**

- a. Identification and analysis of risks related to the entity's objectives is performed under the risk assessment component.
- b. Organizational objectives, risk and fraud identification, and assessing changes that impact internal control are principles of this component.

**3. Information and Communication**

- This principle includes capturing and processing information.
- Financial reporting and internal control information as well as internal and external communication are supporting principles of the information and communication component.

**4. Monitoring**

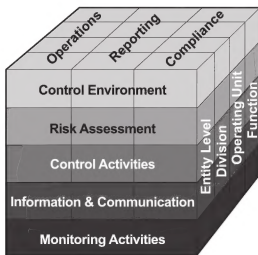
- Monitoring the effectiveness of internal control is the goal of the monitoring component.
- Monitoring by way of ongoing and separate evaluations and reporting findings (deficiencies) are the related principles.

**5. (Existing) Control Activities**

- The policies and procedures that respond to the risk assessment are the subject of the control activities component.
- Principles of (existing) control activities include selecting and developing control activities, developing technological controls, and deploying policies and procedures.

**C. COSO Cube**

The three-dimensional COSO cube demonstrates that there is a direct relationship between an entity's three framework objectives, its five integrated internal control components, and the organizational structure of the entity.

**D. Effective (Ineffective) Internal Control—COSO**

- The framework defines an effective internal control system as one that provides reasonable assurance that the entity's objectives will be achieved. The framework *general requirements* include:
  - Five components and seventeen principles that are relevant are to be both present and functioning.
  - All five components operating together as an integrated system are a means to reduce the risk to an acceptable level that the entity will not achieve its objectives.

2. In order to be considered an effective system of internal control, senior management and the board must achieve reasonable assurance (meet *specific requirements*) that the entity:
  - a. understands when its operations are managed effectively and efficiently.
  - b. complies with applicable rules, regulations, and external standards.
  - c. prepares financial reports that conform to the entity's reporting objectives and all applicable rules, regulations, and standards.
3. When a major deficiency is identified pertaining to the presence and functioning of a component or a relevant principle, or if the components do not operate together in an integrated manner, the entity has an ineffective internal control system under the COSO framework.

#### IV. ENTERPRISE RISK MANAGEMENT

In 2004, the COSO issued *Enterprise Risk Management—Integrated Framework* (ERM) to assist organizations in developing a comprehensive response to risk management. The intent of enterprise risk management is to allow management to effectively deal with uncertainty, evaluate risk acceptance, and build value.

- A. The ERM framework includes the following themes:
  1. Align risk appetite and strategy.
  2. Enhance risk response decisions.
  3. Reduce operational surprises and losses.
  4. Identify and manage multiple and cross-enterprise risks.
  5. Seize opportunities.
  6. Improve the deployment of capital.
- B. ERM objectives may be strategic, operational, reporting, or compliance related.
- C. The components of ERM follow in logical sequence using the mnemonic **IS EAR AIM**:
  1. **Internal Environment**
    - a. The tone of the organization.
    - b. The risk consciousness of the staff as influenced by the internal environment.
  2. **Setting Objectives**
    - a. Strategic objectives establish the basis for related operations, reporting, and compliance objectives.
    - b. Objectives are aligned with the risk tolerances (risk appetite) of the organization.
  3. **Event Identification**
    - a. Events are identified that may positively impact the organization's ability to meet its objectives (opportunities).
    - b. Events are identified that negatively impact the organization's ability to meet its objectives (risks).
    - c. Risk and opportunities consider internal and external factors.

**4. Assessment of Risk**

- a. Management assesses the likelihood (probability) and impact (severity) of events.
- b. Management looks at risk on an inherent basis (what may occur if no risk response is taken) and a residual basis (what risk is left after consideration of a risk response).

**5. Risk Response**

- a. Risk response can be risk avoidance, reduction, sharing, or acceptance.
- b. Risk response is considered in relation to effect on likelihood and severity, and in relation to cost benefit.

**6. Activities (Control)**

Control activities are the policies and procedures that carry out risk response.

**7. Information and Communication**

Information is gathered and communicated in time to respond to risk.

**8. Monitoring**

Risk management is assessed for presence and functioning over time.

- D. Although ERM is an outstanding tool, its limitations include being subject to human judgment, evaluations made in error, and management override of controls.

**V. CHANGE CONTROL PROCESS**

- A. Change control management and processes consider the manner in which management monitors and authorizes changes to information technology matters including software application programs, system software, database administration, networks and security, and job scheduling.
- B. The application of change management in less complex computer environments usually involves the installation of pre-packaged software. In this environment, change control involves computer patches. The individuals responsible for making the change and putting the change into production should be segregated.
- C. Applying change management to more complex computer systems requires adaptation to more sophisticated requirements. Changes that require documentation should be defined and the individuals responsible for making the change and putting the change into production should be segregated.



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**MULTIPLE-CHOICE QUESTIONS**

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**QUESTION 1**

Which of the following is true of audit committees under the provisions of the Sarbanes-Oxley Act of 2002?

1. A majority of the audit committee must consist of financial experts.
2. No financial experts are required if the audit committee can consult with either the auditor or the chief financial officer.
3. At least one audit committee member must be a financial expert.
4. At least two audit committee members must be financial experts and one must be a CPA.

**QUESTION 2**

Which of the following is true regarding a financial expert serving on the audit committee of an issuer that is complying with the Sarbanes-Oxley Act of 2002?

1. The audit committee member may qualify for recognition as a financial expert using most any combination of education and experience auditing or preparing financial reports.
2. An audit committee member must have been a member of the board of directors for five years before serving as a financial expert.
3. An audit committee member qualifying as a financial expert must have adequate technical training and experience as an auditor.
4. Disclosure of the financial expert is made at the election of the audit committee.

**QUESTION 3**

The Committee on Sponsoring Organization's (COSO) *Internal Control—Integrated Framework* includes a risk assessment component that includes all of the following in its principles, *except*:

1. Organizational objectives
2. Assessing changes that impact internal control
3. Considering the potential for fraud
4. Organizational structure

**QUESTION 4**

The Committee on Sponsoring Organization's (COSO) *Internal Control—Integrated Framework* includes five distinct components that include all the following, *except*:

1. Control environment.
2. Risk assessment.
3. Risk response.
4. Control activities.

QUESTION 5

An issuer that is assessing the effectiveness of the design and operation of its internal control, as required by the Sarbanes-Oxley Act of 2002, would most likely look to what document or source for guidance?

1. Sarbanes-Oxley Act of 2002.
2. Internal Control—Integrated Framework.
3. Enterprise Risk Management—Integrated Framework.
4. Statements on Auditing Standards.

## TASK-BASED SIMULATIONS

TASK-BASED SIMULATION 1: *Written Communication*

The Chairman of the Board of Directors is worried about the upcoming audit. Specifically, he is concerned about how he will prove to the auditors that the Board of Directors has fulfilled its oversight function in accordance with the COSO Internal Control-Integrated Framework. As the Chief Financial Officer, draft a memo to the Chairman describing what the auditors might look for in regards to the following board attributes:

- Operates independently
- Monitors risk
- Retains financial reporting expertise
- Oversees audit activities

Type your communication in the response area below using the word processor provided.

**REMINDER:** Your response will be graded for both technical content and writing skills. Technical content will be evaluated for information that is helpful to the intended reader and clearly relevant to the issue. Writing skills will be evaluated for development, organization, and the appropriate expression of ideas in professional correspondence. Use a standard business memo or letter format with a clear beginning, middle, and end. Do not convey information in the form of a table, bullet point list, or other abbreviated presentation.

MEMORANDUM	
To:	Chairman, Board of Directors
Subject:	Board Oversight
<i>[Response area]</i>	
Sincerely,  <i>Chief Financial Officer</i>	

TASK-BASED SIMULATION 1: *Solution*

## MEMORANDUM

To: Chairman, Board of Directors  
Subject: Board Oversight

The purpose of this memo is to identify and explain the kinds of activities that will enable the auditors to conclude that the Board of Directors is fulfilling its oversight function in accordance with the COSO Internal Control-Integrated Framework.

One of the characteristics of an effective board is the ability of each member to provide independent advice to our company. You may recall, annually our company requires each board member to disclose in writing any personal relationships and material direct or indirect financial transactions with our company. In addition to this, we have a process in place where the Vice President of the board reviews these disclosures and evidences his review via signature on the certification statement. Before any vote is taken, the VP verbally reminds board members to vote independently and, if applicable, has the power to ask board members to recuse themselves from the vote in the event that they are not entirely independent on the issue at hand. While our by-laws document the responsibilities of the Vice President, the board minutes document the actions of the board and VP, consistent with the policy defined in the by-laws. Rest assured that the auditors will review both of these documents and find the evidence to support a conclusion on board oversight.

We also have a separate nominating committee that identifies and screens potential board members. Evidence that the nominating committee has performed their duties includes a review of background checks performed as well as the written recommendations made by this committee.

Another attribute that the auditors will assess is the board's ability to monitor risk. One of the most powerful ways to demonstrate effective board oversight is to establish an empowered audit committee with the authority and responsibility to meet privately with internal and external auditors and respond directly to significant audit findings. Staffing the audit committee with knowledgeable financial professionals such as CPAs provides additional comfort to auditors that the board has the capacity to understand the gravity of the issues put before them. While the auditors have both the charter and by-laws to support the creation and empowerment of the audit committee, their selection and retention provides further support that the audit committee is actually performing the responsibilities assigned to it.

Further proof of effective oversight can be obtained by reviewing the certification statements made by the audit committee, which attest to review activities performed and decisions made. In addition, the board minutes document the adoption of new accounting policies and procedures. Lastly, the auditors can examine whistle-blower logs to determine how complaints were handled and the timeliness of the board response.

As you can see, we have a number of mechanisms already in place that will objectively demonstrate the effectiveness of our board.

Feel free to contact me should you need anything further regarding this matter.

Sincerely,  
*Chief Financial Officer*

# BUSINESS 1B

## BUSINESS 1B

### *Operations Management*

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#### Performance Management and Impact of Measures on Behavior

- Financial and Nonfinancial Performance Measures
- Impact of Marketing Practices on Performance
  - Incentive Compensation

#### Cost Measurement Methods and Techniques

- Cost Objects
  - Tracing Costs to Cost Objects
    - Cost Behavior
- Cost Accumulation Systems
  - Cost of Goods Manufactured and Sold
    - Job Order Costing
      - Process Costing
    - Activity-Based Costing
  - Joint Product Costing and By-Product Costing

## NOTES

**PERFORMANCE MANAGEMENT AND IMPACT OF MEASURES ON BEHAVIOR****I. FINANCIAL AND NONFINANCIAL PERFORMANCE MEASURES****A. Financial Measures**

The following are used as a financial measure of performance:

1. *Profit* is the amount of income generated after expenses.
2. *Return on investment* is the income generated based on a given investment (e.g., total assets employed, stockholders' equity).
3. *Variance analysis* compares actual performance to expected performance.
4. *Balance scorecard* is a framework used to convert an entity's strategic objectives into a set of performance measures.

**B. Nonfinancial Measures**

1. External benchmarks-productivity measures:
  - a. *Total factor productivity ratios (TFPs)* reflect the quantity of all output produced relative to the costs of all inputs used.
  - b. *Partial productivity ratios (PPRs)* reflect the quantity of output produced relative to the quantity of individual inputs used.
2. Internal benchmarks-techniques for analyzing problems:
  - a. A *control chart* is a graphical tool used to plot a comparison of actual results by batch to an acceptable range to determine improvement or deterioration of quality conformance.
  - b. A *Pareto diagram* is used to plot the frequency of defects from the highest to lowest frequency.
  - c. *Cause-and-effect (fishbone) diagrams* are used to identify recurring and costly defects and then break down the problems that led to the individual defects.

**C. Characteristics of Effective Performance Measures**

Effective performance measures promote the achievement of goals. Typically, the characteristics of those measures:

1. relate to the goals of the organization;
2. balance long- and short-term issues;
3. reflect management of key activities, sometimes referred to as critical success factors in the balanced scorecard;
4. are under the control or influence of the employee;
5. are understood by the employee;
6. are used to both evaluate and reward the employee or otherwise constructively influence behavior;
7. are objective and easily measured; and
8. are used consistently.

## II. IMPACT OF MARKETING PRACTICES ON PERFORMANCE

- A. Marketing seeks to establish value for an organization's products. Marketing decisions relate to the establishment of value and the methods used to promote or sell products to customers or prospective customers.
- B. Two primary methods of marketing are *transaction marketing* and *interaction-based relationship marketing*. Transaction marketing ends with the sale, while relationship marketing anticipates that the sale is the beginning of an ongoing relationship.
- C. Sales-volume-driven compensation and evaluation methods are appropriate for transaction marketing, whereas customer satisfaction and quality measures are more appropriate for relationship-based marketing.

## III. INCENTIVE COMPENSATION

- A. Management compensation may be based on a fixed salary, bonus, or perks (e.g., free health club membership).
- B. Management bonus programs may be fixed (formula driven) or variable (subjective). Fixed bonus programs do not accommodate balanced scorecard presentations.
- C. Incentives may be based on competitive or cooperative criteria and could reward local versus company-wide performance.
- D. Rewards should recognize current performance but consider the effect of the rewarded behavior on future results for the company.

## COST MEASUREMENT METHODS AND TECHNIQUES

### I. COST OBJECTS

Cost objects (objectives) are resources or activities that serve as the basis for management decisions.

#### A. Product Costs

1. Product costs comprise all costs related to the manufacturing of a product.
2. Components of product costs include direct material, direct labor, and manufacturing overhead applied.
3. Product costs are inventoriable and traceable (e.g., work in process inventory, finished goods inventory, and cost of goods sold).

#### B. Period Costs

1. Period costs (e.g., selling, general and administrative expenses) are expensed in the period in which they are incurred and are not inventoriable.

#### C. Manufacturing Costs

1. Manufacturing costs (e.g., direct materials, direct labor, and manufacturing overhead) include all costs associated with the manufacturing of a product.
2. Manufacturing costs include both direct and indirect costs.

#### D. Nonmanufacturing Costs

1. Nonmanufacturing costs are costs that do not relate to the manufacturing of a product, such as advertising costs and salaries of sales personnel.
2. Nonmanufacturing costs are expensed in the period incurred.



## II. TRACING COSTS TO COST OBJECTS

### A. Direct Costs

1. A direct cost can be easily traced to the cost pool or cost object.
2. Direct costs include direct raw materials and direct labor.

### B. Indirect Costs

1. An indirect cost is not easily traced to the cost pool or cost object.
2. Also known as manufacturing overhead, indirect costs include indirect materials, indirect labor, and other indirect costs (e.g., machine maintenance costs).
3. Indirect costs are allocated to cost pools/objects using cost drivers that have a significant relationship to the incurrence of these costs.

## III. COST BEHAVIOR (*fixed vs. variable*)

### A. Variable Costs

1. A variable cost *varies in total* as production volume increases or decreases, but remains *constant on a per unit basis*.
2. Direct materials and direct labor are variable costs.

### B. Fixed Costs

1. A fixed cost *remains constant in total*, regardless if the production volume increases or decreases, but *varies per unit*.
2. Depreciation would be classified as a fixed cost.
3. Over a long-run time horizon, any cost can be considered variable.

### C. Semi-Variable Costs (*mixed costs*)

1. Semi-variable costs are costs that contain both fixed and variable components (e.g., water utilities, where there is a fixed monthly charge plus a variable rate per gallon used).

### D. Relevant Range

1. The relevant range is the (graphical) range for which the assumptions of a cost driver are valid.
2. Any cost driver activity that is outside the relevant range cannot be used to allocate costs to objects.

## IV. COST ACCUMULATION SYSTEMS

### A. Cost accumulation systems are used to assign costs to products.

1. Use job-order costing when the cost object is a custom order (a batch of business cards).
2. Use process costing when the cost object is a mass-produced homogeneous product (canned vegetables).

## V. COST OF GOODS MANUFACTURED AND SOLD

### A. Cost of Goods Manufactured

The cost of goods manufactured statement accounts for the manufacturing costs of the products completed during the period. Cost of goods manufactured is used as part of the cost of goods sold computation.

Beginning WIP		XXX
Direct materials used	XXX	
Direct labor	XXX	
Factory overhead <i>applied</i> *	<u>XXX</u>	
Total manufacturing costs		<u>XXX</u>
Manufacturing costs available		XXX
Less: Ending WIP		<XXX>
Cost of goods manufactured		<u>XXX</u>

\*Factory overhead is *applied* based on a predetermined rate. In traditional costing, estimated costs are divided by a common divisor, such as direct labor hours, direct labor costs, or machine hours. The formula for the traditional overhead application method is as follows:

$$\text{Predetermined OH rate} = \frac{\text{Estimated total overhead costs}}{\text{Estimated total direct labor hours or other divisors}}$$

### B. Cost of Goods Sold

Cost of goods sold is the amount matched against sales revenue as part of income determination.

Beginning finished goods inventory	XXX
Cost of goods manufactured	<u>XXX</u>
= Cost of goods available for sale	XXX
Less: Ending finished goods inventory	<XXX>
Cost of goods sold	<u>XXX</u>

If overhead applied is greater than the total actual overhead costs incurred, we say overhead is overapplied. If the applied overhead is less than the actual, we have underapplied overhead. Overapplied overhead is closed to cost of goods sold as a credit to the expense. Underapplied overhead is closed to cost of goods sold as a debit to the expense.

## VI. JOB ORDER COSTING

Job-order costing is a cost accumulation or product costing method that involves unique or easily identifiable units. This method is used when manufacturing custom products such as customized cars, boats and houses.

- Costs are allocated to a specific job as it moves through the manufacturing process.
- Job cost records* or job orders accumulate all costs for a specific job with data obtained from material requisitions and labor time cards.
- Once the job is complete, the total cost is readily available on the job cost record.

## VII. PROCESS COSTING

Process costing accumulates costs by department or process. Two methods are used: FIFO and weighted average. Generally, *equivalent units* and *cost per equivalent unit* must be calculated. Unit and cost flow assumptions are specific to each method.

### A. Application

Process costing is used in those instances in which homogenous units of output are produced and average costing is appropriate. Applications include fuel refining, chemical processing, and paper production.

Transfers in from other departments are always considered 100 percent complete. The transfer in costs of direct material from a previous department are treated as direct materials (DM), even though they are called "transfer in" costs or "previous department" costs.

Direct material added at the beginning of or during a second or later process may either be 100 percent complete or "partially complete," depending on how much work has been done on that component of the process.

Any material added at the (very) end of a process will not be in work in process inventory at the month end.

### B. Equivalent Units

An equivalent unit of direct material, direct labor, or conversion costs is equal to the amount of direct material, direct labor, or conversion costs necessary to complete one unit of production. Equivalent units of production may be computed using either first-in first-out (FIFO) or weighted average assumptions. The FIFO approach specifically accounts for work to be completed during a period, while the weighted average approach accounts for work completed during the period as well as the work performed last period on this period's beginning inventory.

#### 1. FIFO (three steps)

Beginning WIP x % to be completed	XXX
Units completed – Beginning WIP	XXX
Ending WIP x % completed	XXX
Equivalent units	XXX

#### 2. Weighted Average (two steps)

Units completed	XXX
Ending WIP x % completed	XXX
Equivalent units	XXX

### C. Cost per Equivalent Units

Cost per equivalent unit is computed by dividing total costs by equivalent units. FIFO anticipates using only current period costs, while the weighted average approach uses both costs of beginning inventory and current period costs as follows:

#### 1. FIFO

$$\text{FIFO} = \frac{\text{Current cost only}}{\text{Equivalent units}}$$

#### 2. Weighted Average

$$\text{Weighted average} = \frac{\text{Beginning cost} + \text{Current cost}}{\text{Equivalent units}}$$

**D. Spoilage**

Equivalent units added for a month are usually less than the actual units added during the month as a result of problems with the production process. This is the result of spoilage or shrinkage, which is usually factored in automatically. There are two types of spoilage:

1. *Normal spoilage* occurs under regular operating conditions and is charged to factory overhead (inventory cost).
2. *Abnormal spoilage* does not occur under normal operating conditions and is treated as a period expense. Examples of abnormal spoilage include floods, fire damage, and spoilage materially in excess of standard caused by inefficient equipment or labor.

**VIII. ACTIVITY-BASED COSTING (ABC)****A. Defined**

Activity-based costing (ABC) is a costing system that divides production into activities where costs are accumulated (cost pools) and allocated to the product based on the level of activity demanded by the product.

**B. Characteristics**

ABC tends to increase both the number of cost pools (e.g., production orders, material handling, etc.) and allocation bases (e.g., number of production orders, pounds, etc.), whereas a traditional cost system would use one cost base and one allocation base (e.g., factory overhead/direct labor hours).

**C. Service Cost Allocation**

When using ABC, companies may allocate service department costs to production or user departments and ultimately the final products produced. Service costs may be allocated using the direct method or step-down method.

1. Under the *direct method*, each service department's total costs are allocated to the production departments directly without recognizing that service departments themselves may also use the services from other service departments.
2. Under the *step-down method*, service department costs are allocated to production departments as well as other service departments that use a given service department's services. The allocation to other service departments is done through a step-down allocation process.

**IX. JOINT PRODUCT COSTING AND BY-PRODUCT COSTING**

In joint product costing (JPC), two or more products are produced from the same common raw material. Joint product costing methods are used to segregate costs associated with each product jointly produced by the same process. Examples include the fuel refining process that produces various octane levels, and lumber processing that produces construction and nonconstruction-grade products.

**A. JPC-Relative Sales Value at Split-off Approach**

Joint costs are allocated to joint products based on the relative sales value at split-off.

**1. Example**

Joint costs	\$1,000	
Product A: Sales value at split-off		\$10,000
Product B: Sales value at split-off		<u>30,000</u>
Total		<u>\$40,000</u>

**2. Computation**

Hence, 1/4 of the \$1,000 joint costs, or \$250, is assigned to Product A, and 3/4 of the \$1,000 joint costs, or \$750, is assigned to Product B.

**B. JPC-Net Realizable Value Approach**

Costs added after the split-off point (separable costs) must be subtracted from the final selling price to arrive at the net realizable value (NRV).

**1. Example**

Joint costs \$6,000	<u>NRV</u>
Product A: Final selling price \$12,000, after split-off cost \$2,000 =	\$10,000
Product B: Final selling price \$25,000, after split-off cost \$5,000 =	<u>20,000</u>
Total	<u>\$30,000</u>

**2. Computation**

Hence, the NRV of Product A is \$10,000 and Product B is \$20,000. Therefore, 1/3 of the \$6,000 joint costs, or \$2,000, would be assigned to Product A, and 2/3 of the \$6,000 joint costs, or \$4,000, would be assigned to Product B.

**C. JPC-Service Departments Cost Allocation to Joint Products**

Service department costs are allocated to joint products based on the joint products proportional unit-volume relationship.

**1. Example**

The janitorial service department provides services for Products A and B. The department incurs costs of \$6,000, which are allocated to each product based on the joint products unit-volume relationship.

Product A	10,000 gal.
Product B	<u>20,000 gal.</u>
Total	30,000 gal.

Janitorial service department costs are allocated as follows:

Product A: $(10,000 / 30,000) \times \$6,000$	\$2,000
Product B: $(20,000 / 30,000) \times \$6,000$	<u>4,000</u>
Total	<u>\$6,000</u>

**D. By-products**

By-products represent outputs of minor value incidental to a manufacturing process. Accounting can take one of two forms:

1. Revenue applied to the main product as a cost reduction.
2. Miscellaneous income.

## NOTES

## MULTIPLE-CHOICE QUESTIONS

### QUESTION 1

The Long Haul Trucking Company is developing metrics for its drivers. The company computes variable costs of each load based upon miles driven and allocates fixed costs based upon time consumed. Load costing standards consider safe driving speeds and Department of Transportation regulations on hours of service (the amount of time the driver can be on duty or drive). The most effective metric for driver performance would likely be:

1. Contribution per mile driven.
2. Gross margin per mile driven.
3. Achievement of delivered loads in allowed times.
4. Percentage increase in delivered loads below standard.

### QUESTION 2

Lifetime Insurance Agency sells a full line of personal as well as property and casualty lines. The company pays commissions to its sales force based upon a combination of premium and customer satisfaction matrices. Commission rates are 20% in the first year and 10% for renewals. Lifetime's marketing practice would best be described as:

1. Transactional.
2. Relationship.
3. Network.
4. Database.

### QUESTION 3

Sepulveda Corporation uses a process costing system to manufacture laptop PCs. The following information summarizes operations for its VeryLite model during the quarter ending March 31, Year 1:

	<u>Units</u>	<u>Direct Materials</u>
Work-in-process inventory, January 1	100	\$ 60,000
Started during the quarter	500	
Completed during the quarter	400	
Work-in-process inventory, March 31	200	
Costs added during the quarter		\$840,000

Beginning work-in-process inventory was 50% complete for direct materials. Ending work-in-process inventory was 75% complete for direct materials. What were the equivalent units for direct materials for March using the FIFO method?

1. 450
2. 500
3. 550
4. 600

## QUESTION 4

Penn Manufacturing Corporation uses a process costing system to manufacture printers for PCs. The following information summarizes operations for its NoToner model during the quarter ending September 30, Year 1:

	<u>Units</u>	<u>Direct Labor</u>
Work-in-process inventory, July 1	100	\$ 50,000
Started during the quarter	500	
Completed during the quarter	400	
Work-in-process inventory, September 30	200	
Costs added during the quarter		\$775,000

Beginning work-in-process inventory was 50% complete for direct labor. Ending work-in-process inventory was 75% complete for direct labor. What is the total value of the direct labor in the ending work-in-process inventory using the weighted average method?

1. \$183,000
2. \$194,000
3. \$225,000
4. \$210,000



# BUSINESS 2A

## BUSINESS 5A

*Cost Accounting 1*

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- Breakeven Analysis
- Balanced Scorecards
- Responsibility Segments
- Cost Assignment—Absorption (Full) vs. Variable (Direct) Costing
- High-Low Method

## **NOTES**

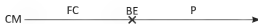
## SUMMARY NOTES

## I. BREAKEVEN ANALYSIS

*Breakeven analysis* determines the sales required (in dollars or units) to result in zero profit or loss from operations. After breakeven has been achieved, each additional unit sold will increase net income by the amount of the **contribution margin** per unit.

## CONTRIBUTION APPROACH

Sales	XXX
Less: Variable costs	(XXX)
<b>Contribution margin</b>	<b>XXX</b>
Less: Fixed costs	(XXX)
<b>Profit</b>	<b>XXX</b>



## A. Standard Formulas

## 1. Breakeven Point in Units

$$\frac{\text{Total fixed costs}}{\text{Contribution margin per unit}} = \text{Breakeven point in units}$$

## 2. Breakeven Point in Dollars

- a. Multiply the breakeven units and the selling price per unit:

$$\text{Unit price} \times \text{Breakeven point in units} = \text{Breakeven point in dollars}$$

- b. Contribution margin ratio approach:

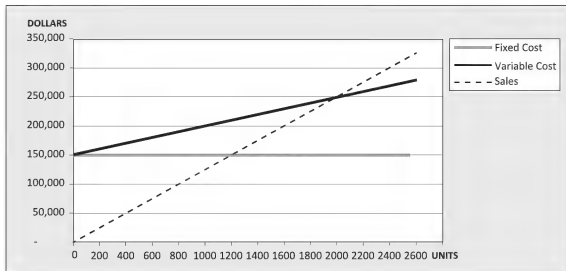
$$\frac{\text{Total fixed costs}}{\text{Contribution margin ratio}} = \text{Breakeven point in dollars}$$

## B. Required Sales for a Desired Profit

Breakeven analysis can be extended to calculate the required sales to produce a desired net income by treating the desired net income as another fixed cost.

$$\text{Required sales (units or \$'s)} = \frac{\text{Total fixed cost} + \text{Desired profit}}{\text{C/M \% or C/M per unit}}$$

### C. Breakeven Chart



### D. Margin of Safety

The margin of safety is the excess of sales over breakeven sales.

1. The margin of safety expressed in dollars is calculated as follows:

$$\text{Total sales in dollars} - \text{Breakeven sales in dollars} = \text{Margin of safety in dollars}$$

2. The margin of safety can also be expressed as a percentage of sales:

$$\frac{\text{Margin of safety in dollars}}{\text{Total sales}} = \text{Margin of safety percentage}$$

## II. BALANCED SCORECARDS

The *balanced scorecard* (generally a senior management or executive tool) is one such control mechanism that gathers information on multiple dimensions of an organization's performance defined by critical success factors necessary to accomplish firm strategy. Critical success factors can be classified within various categories and are commonly displayed as:

### A. Financial Performance

This category includes critical *financial performance* measures, such as current ratio or gross margin.

### B. Internal Business Processes

This category includes critical *business process* measures, such as through-put time.

### C. Customer Satisfaction or Advancement of Innovation

This category includes critical *customer satisfaction* measures, such as customer retention.

### D. Human Resource Development

This category includes critical *human resource* measures, such as employee retention, innovations, suggestions made and accepted, etc.

### III. RESPONSIBILITY SEGMENTS

*Responsibility segments*, sometimes referred to as *strategic business units* (SBUs), are highly effective in establishing accountability for financial dimensions of the business. Performance reporting for each SBU measures financial responsibility. SBUs are often subdivided into additional categories, including product lines, geographic areas, or customers. Specific SBU classifications include:

#### A. Cost SBU

Managers are held responsible for controlling costs in a *cost SBU*.

#### B. Revenue SBU

Managers are held responsible for generating revenues in a *revenue SBU*.

#### C. Profit SBU

Managers are held responsible for producing a target profit (i.e., accountability for both revenue and costs) in a *profit SBU*.

#### D. Investment Sbu

Managers are held responsible for the return on the assets invested in an *investment SBU*. The return must be equal to or greater than the management minimum required rate of return.

### IV. COST ASSIGNMENT—*Absorption (Full) vs. Variable (Direct) Costing*

Absorption costing represents GAAP basis computations of gross profit, while variable (direct) costing develops contribution margins compatible with break-even analysis.

#### A. Absorption (Full Costing) Approach

Absorption costing capitalizes fixed factory overhead as part of inventory in accordance with GAAP. Therefore, absorption costing includes direct materials, direct labor, and fixed and variable overhead.

Revenue	XXX
Less: Cost of goods sold	<u>(XXX)</u>
Gross profit	XXX
Less: Operating expenses	<u>(XXX)</u>
Net income	<u>XXX</u>

#### B. Variable (Direct) Costing

In variable (direct) costing, only variable manufacturing costs (direct materials, direct labor, and variable factory overhead) are included in inventory. Fixed factory overhead is **excluded** from inventory and treated as a period cost:

Sales	XXX
Less: Variable costs	<u>(XXX)</u>
Contribution margin	XXX
Less: Fixed costs	<u>(XXX)</u>
Net income	<u>XXX</u>

**C. Income Effect**

<i>Relationship Between Production and Sales for the Period</i>	<i>Effect on Inventories</i>	<i>Relationship Between Absorption and Variable Costing Net Incomes</i>
Production = Sales	No change in inventories	Absorption costing net income = Variable costing net income
Production > Sales	Inventory increase	Absorption costing net income* > Variable costing net income
Production < Sales	Inventory decrease	Absorption costing net income** < Variable costing net income

\* Net income is higher under absorption costing because fixed manufacturing overhead cost is deferred in inventory as inventories increase.

\*\* Net income is lower under absorption costing because fixed manufacturing overhead cost is released from inventory as inventories decrease.

**V. HIGH-LOW METHOD**

The high-low point method is used to estimate the fixed and variable portions of cost. It assumes that the differences between costs at the highest and lowest production levels are due directly to variable costs. Variable and fixed costs are calculated as follows:

**A. Computation of Variable Cost per Unit**

$$\frac{\text{Costs at high} - \text{Costs at low}}{\text{Activities at high} - \text{Activities at low}} = \frac{\text{Changes in costs}}{\text{Changes in activities}} = \text{Variable cost per unit}$$

**B. Computation of Total Fixed Costs**

$$\text{Total cost} - (\text{Variable cost per unit} \times \text{Activity}) = \text{Fixed costs}$$

## MULTIPLE-CHOICE QUESTIONS

### QUESTION 1

In Year 1, its first year of operations, Duke Manufacturing incurred the following costs when it produced 200,000 and sold 160,000 units of its only product, Blue:

Manufacturing costs—Fixed	\$360,000
Variable	320,000
Selling and admin costs—Fixed	180,000
Variable	80,000

How much lower would Duke's net income for Year 1 have been if it had used variable costing instead of absorption costing?

1. \$72,000
2. \$54,000
3. \$68,000
4. \$94,000

### QUESTION 2

Presented below is the production data for the first six months of the year for mixed costs incurred by Mouton Corporation:

<u>Month</u>	<u>Cost</u>	<u>Units</u>
January	\$14,700	1,800
February	15,200	1,900
March	13,700	1,700
April	14,000	1,600
May	14,300	1,500
June	13,100	1,300
July	12,800	1,100
August	14,600	1,500

Mouton Corporation uses the high-low method to analyze mixed costs. Variable cost per unit and fixed cost are respectively:

- |    | <u>VC</u> | <u>FC</u> |
|----|-----------|-----------|
| 1. | \$1.00    | \$13,100  |
| 2. | \$3.00    | \$9,500   |
| 3. | \$1.00    | \$12,800  |
| 4. | \$2.00    | \$15,200  |

## QUESTION 3

William Company is experiencing profit problems and is analyzing its manufacturing cost behavior, which it does not really understand. Which of the following statements is/are correct with respect to cost volume profit analysis?

- I. An assumption of cost volume profit analysis is that all costs behave in a nonlinear fashion in relation to production.
  - II. An assumption of cost volume profit analysis is that selling prices vary no more than 10%, up or down, within the relevant range of William's production.
  - III. Contribution margin is defined as revenue less fixed costs.
1. I, II, and III are correct.
  2. I only is correct.
  3. II and III only are correct.
  4. None of the listed choices are correct.

## QUESTION 4

Lampassas Corporation manufactures product Lam at its manufacturing facility. At annual sales of \$900,000 for Year 1, product Lam had the following unit sales price and costs:

Sales price	\$20
Prime cost	6
Manufacturing overhead:	
Variable	1
Fixed	7
Selling & administrative costs:	
Variable	1
Fixed	3
Profit	<u>\$ 2</u>

What was product Lam's breakeven point in dollars?

1. \$500,000
2. \$750,000
3. \$630,000
4. \$900,000

## QUESTION 5

Belton Corporation is considering manufacturing and selling a new product. Based on potential sales of 1,000 units per year, the new product has estimated traceable costs of \$1,200,000. What is the price that Belton must charge to obtain a 20% profit margin on sales?

1. \$2,000
2. \$1,200
3. \$1,500
4. \$1,000



# BUSINESS 2B BUSINESS 5B

*Cost Accounting 2*

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- Budgets
- Variance Analysis
- Special Orders
- Make-or-Buy Decisions
- Regression Analysis
- Statistical Measures Used to Evaluate Regression Analysis

## **NOTES**

## SUMMARY NOTES

## I. BUDGETS

## A. Master Budgets

A *master budget* is a budget at one level of activity.

## 1. Design

A master budget (often referred to as a "static" budget) is generally comprised of operating budgets and financial budgets.

## 2. Characteristics

The *annual plan* anticipates the coming year's activities that will contribute to the accomplishment of the long-term and short-term goals outlined in the company's strategic plan.

## B. Flexible Budgets

*Flexible budgets* are budgets at various levels of activity.

## 1. Design

Flexible budgets are normally designed for a period of one year or less to accommodate the potential changing relationship between per unit revenues and costs.

## 2. Characteristics

Flexible budgets include consideration of revenue per unit, variable costs per unit, and fixed costs over the relevant range.

## II. VARIANCE ANALYSIS

*Variance analysis* involves differences between budgeted (targeted) and actual performance.

- Actual cost lower than standard produces a favorable variance.
- Actual cost higher than standard produces an unfavorable variance.

Variances are calculated for:

- Direct material
- Direct labor
- Manufacturing overhead

## A. Direct Materials and Direct Labor Variance

For direct materials and direct labor, two variances are calculated:

- Price and quantity variance
- Rate and efficiency variance

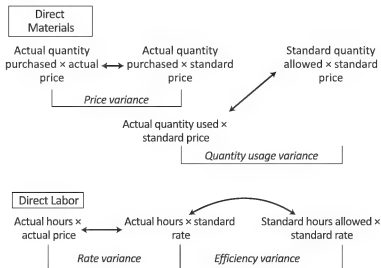
**EQUATION FORMAT**

$$\text{DM price variance} = \frac{\text{Actual quantity purchased}}{\text{purchased}} \times (\text{Actual price} - \text{Standard price})$$

$$\text{DM quantity usage variance} = \text{Standard price} \times \left( \frac{\text{Actual quantity used}}{\text{quantity used}} - \frac{\text{Standard quantity allowed}}{\text{quantity allowed}} \right)$$

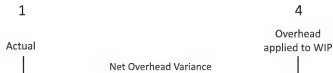
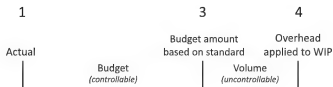
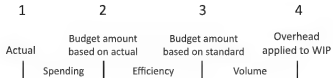
$$\text{DL rate variance} = \frac{\text{Actual hours worked}}{\text{worked}} \times (\text{Actual rate} - \text{Standard rate})$$

$$\text{DL efficiency variance} = \text{Standard rate} \times \left( \frac{\text{Actual hours worked}}{\text{worked}} - \frac{\text{Standard hours allowed}}{\text{hours allowed}} \right)$$

**TABULAR FORMAT****B. Manufacturing Overhead Variance**

Three different overhead variance models are:

1. **Net Overhead Variance** (*one-way variance*)
2. **Two-way Variance**
  - a. Budget (Controllable) Variance
  - b. Volume (Uncontrollable) Variance
3. **Three-way Variance**
  - a. Spending Variance
  - b. Efficiency Variance
  - c. Volume (Uncontrollable) Variance

**TABULAR FORMAT****OVERHEAD VARIANCES****One-way Variance:***(Overapplied or Underapplied)***Two-way Variance:****Three-way Variance:**

1 = Actual overhead costs incurred compared to Applied

2 = Budgeted FOH + (Actual DLH worked × Standard VOH rate per DLH)

3 = Budgeted FOH + (Standard DLH allowed × Standard VOH rate per DLH)

4 = Standard (total) OH rate/DLH × Standard DLH allowed

Standard hours allowed = Standard DLH per unit × Actual units produced

Standard (total) OH rate/DLH = Standard VOH rate per DLH + Budgeted FOH/Budgeted DLH

**III. SPECIAL ORDERS**

*Special order decisions* are defined as generally infrequent opportunities that require the firm to decide if a special order should be accepted or rejected. Generally, we consider most direct and variable costs as well as incremental costs.

**A. Presumed Excess Capacity**

1. Compare the incremental (additional) costs of the order to the incremental (additional) revenue generated by the order. This process compares the variable cost per unit to the revenue generated per unit.
2. Provided the selling price per unit is greater than the variable cost per unit, the contribution margin will increase and the special order should be accepted.
3. Excess capacity is often assumed, fixed costs are sunk and will not be relevant to these decisions.

**B. Presumed Full Capacity**

1. Extend the analysis described above to include opportunity cost.
2. The opportunity cost will be the contribution margin that would have been produced if the special order were not accepted.
3. The production that is forfeited to produce the special order is referred to as the next best alternative use of the facility.

#### IV. MAKE-OR-BUY DECISIONS

Similar to accepting or rejecting a special order, managers must consider capacity and, where appropriate, opportunity costs.

##### A. Excess Capacity

If there is *excess capacity*, the cost of making the product internally is the cost that will be avoided (or saved) if the product is not made. This will be the maximum outside purchase price.

Compare variable costs to the purchase price and select the cheapest alternative.

##### B. No Excess Capacity

If there is *no excess capacity*, the cost of making the product internally is the cost that will be avoided (saved) if the product is not made plus the opportunity cost associated with the decision.

Compare the variable costs plus opportunity cost to the purchase price and select the cheapest alternative.

##### C. First Use Existing Capacity Efficiently

Make-or-buy decisions attempt to use existing capacity as efficiently as possible before purchasing from an outside supplier.

#### V. REGRESSION ANALYSIS

Linear regression is a method for studying the relationship between two or more variables. Using regression analysis, variation in the dependent variable is explained using one or more independent variables. The dependent variable is specified to be a linear function of the one or more independent variables.

##### A. Simple Linear Regression vs. Multiple Linear Regression Analysis

Simple regression involves only one independent variable. Multiple regression analysis involves more than one independent variable. The simple linear regression model takes the following form:

$$Y = a + b(X)$$

$$\text{Total cost} = \text{Fixed cost} + \text{Variable rate (units)}$$

#### VI. STATISTICAL MEASURES USED TO EVALUATE REGRESSION ANALYSIS

##### A. Coefficient of Correlation (r)

The *coefficient of correlation* measures the strength of the linear relationship between the independent variable (X) and the dependent variable (Y). In standard notation, the coefficient of correlation is *r*. The range of *r* is from  $-1.0$  to  $+1.0$ , with a value of  $-1.0$  indicating a perfect negative correlation and a value of  $1.0$  indicating a perfect positive correlation.

##### B. Coefficient of Determination ( $R^2$ )

The *coefficient of determination* ( $R^2$ ) may be interpreted as the portion of the total variation in the dependent variable (Y) explained by the independent variable (X). Its value lies between zero and one. The higher the  $R^2$ , the greater the proportion of the total variation in Y that is explained by the variation in X. That is, the higher the  $R^2$ , the better the fit of the regression line.

**MULTIPLE-CHOICE QUESTIONS****QUESTION 1**

Flatbush Corporation has a standard costing system for each of its products. The standard direct material cost to produce a unit of its premier product Brook is 4 pounds of material at \$2.50 per pound, or \$10.00 per unit. During May 20X1, 8,400 pounds of material costing \$20,160 were purchased and used to produce 2,000 units of Brook. What was the materials price variance for May 20X1?

1. \$800 favorable.
2. \$840 favorable.
3. \$160 unfavorable.
4. \$960 unfavorable.

**QUESTION 2**

Flatbush Corporation has a standard costing system for each of its products. The standard direct material cost to produce a unit of its premier product Brook is 4 pounds of material at \$2.50 per pound, or \$10.00 per unit. During May 20X1, 8,400 pounds of material costing \$20,160 were purchased and used to produce 2,000 units of Brook. What was the materials usage variance for May 20X1?

1. \$1,000 unfavorable.
2. \$1,000 favorable.
3. \$1,600 unfavorable.
4. \$960 unfavorable.

**QUESTION 3**

Bedford Corporation produces 2,500 units of its broadband router each month. Each unit is expected to require 4 labor hours at a cost of \$10 per hour. Total labor cost was \$104,500 for 9,500 hours worked. What is the labor rate variance for the production of the router?

1. \$10,000 favorable.
2. \$10,000 unfavorable.
3. \$9,500 favorable.
4. \$9,500 unfavorable.

**QUESTION 4**

Stuyvesant Corporation produces 2,500 units of its broadband router each month. Each unit is expected to require 4 labor hours at a cost of \$10 per hour. Total labor cost was \$104,500 for 9,500 hours worked. What is the labor efficiency variance for the production of the router?

1. \$5,000 favorable.
2. \$5,000 unfavorable.
3. \$9,500 favorable.
4. \$9,500 unfavorable.

## QUESTION 5

Norwood Corporation produces a single product. The standard costs for one unit of its Bedford product are as follows:

Direct materials (6 pounds at \$.50 per pound)	\$ 3
Direct labor (2 hours at \$10 per hour)	20
Variable manufacturing overhead (2 hours at \$5 per hour)	<u>10</u>
Total	\$33

During October 20X2, 4,000 units of Bedford were produced. The costs associated with October operations were as follows:

Material purchased (36,000 pounds at \$.60 per pound)	\$21,600
Material used in production (28,000 pounds)	
Direct labor (8,200 hours at \$9.75 per hour)	79,950
Variable manufacturing overhead incurred	41,820

What is the variable overhead spending variance for Bedford for October 20X2?

1. \$4,200 favorable.
2. \$820 unfavorable.
3. \$1,820 unfavorable.
4. \$1,000 unfavorable.



# BUSINESS 3A

## BUSINESS 3A

*Finance I*

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- Tax Effects of Decisions
- Cost of Capital Computations
  - Discounted Cash Flow
  - Net Present Value (NPV)
  - Internal Rate of Return (IRR)
  - Payback Methods

## **NOTES**

**I. TAX EFFECTS OF DECISIONS**

After-tax cash flows are used in capital budgeting models.

**A. After-tax Costs and Benefits****1. After-tax Costs**

The formula for computing an after-tax cost follows:

$$(1.00 - \text{Tax rate}) \times \frac{\text{Tax-deductible cash expense}}{\text{cash expense}} = \text{After-tax cost (Net cash outflow)}$$

\*Complement of tax rate

**2. After-tax Benefits**

The formula for computing an after-tax benefit follows:

$$(1.00 - \text{Tax rate}) \times \frac{\text{Taxable cash receipt}}{\text{cash receipt}} = \text{After-tax benefit (Net cash inflow)}$$

\*Complement of tax rate

**B. Depreciation Tax Shield**

Even though depreciation does not directly affect cash flows, it does have an effect on the amount of income tax a company will pay, and this effect is called a depreciation tax shield.

**1. Formula**

The formula for computing the tax shield follows:

$$\text{Tax rate} \times \text{Depreciation expense} = \text{Depreciation tax shield}$$

**II. COST OF CAPITAL COMPUTATIONS****A. Cost of Long-term Debt**

The after-tax cost of debt is the multiplication of the pre-tax cost of debt by one minus the tax rate, as follows:

**1. Formula—After-tax Cost of Debt Computation (k<sub>dx</sub>)**

$$\begin{aligned} k_{dx} &= k_{dt} \times (1 - \text{Tax rate}) \\ &= .125 \times (1 - .30) \\ &= .125 \times .70 \\ &= .0875 \end{aligned}$$

*Terms are defined as follows:*

$$\begin{aligned} k_{dt} &= \text{Before-tax cost of debt (Face amount} \times \text{Coupon rate) (assumed to be 12.5\%).} \\ (1 - \text{Tax rate}) &= 1 \text{ minus tax rate stated as a decimal (we assume tax rate is 30\%).} \end{aligned}$$

**B. Cost of Equity Capital****1. Formula (Preferred Shares)—Cost of Preferred Stock Formula (kps)**

$$\begin{aligned}
 kps &= Dps / Nps \\
 &= 10 / (100 - 5) \\
 &= 10 / 95 \\
 &= .10526
 \end{aligned}$$

*Terms are defined as follows:*

- Dps = Cash dividends on preferred stock (assumed to be \$10 per share).  
 Nps = Proceeds of preferred stock sale net of fees and costs (sometimes called "flotation costs") (assumed to be \$100 and \$5 per share, respectively).

**2. Formula (Common Shares)—Cost of Common Stock Formula (kre)—Discounted Cash Flows (DCF) Method**

$$\begin{aligned}
 kre &= (D_1 / P_0) + g \\
 &= (2.15 / 25.25) + .075 \\
 &= .0851 + .075 \\
 &= .1601
 \end{aligned}$$

*Terms are defined as follows:*

- kre = Cost of common equity.  
 $D_1$  = Expected dividend (assumed to be \$2.15).  
 $P_0$  = Current stock price (assumed to be \$25.25).  
 $g$  = Constant growth rate in dividends (assumed to be 7.5%).

**C. Capital Asset Pricing Model (CAPM)**

In addition to the DCF method shown above, the cost of retained earnings (kre) can be calculated using the capital asset pricing model (CAPM).

**1. CAPM Formula for Cost of Retained Earnings (kre)**

The CAPM formula may be expressed as:

$$\begin{aligned}
 kre &= \text{Risk-free rate} + \text{Risk premium} \\
 kre &= krf + (bi \times PMR) \\
 kre &= krf + [bi \times (km - krf)] \\
 &= .05 + [1.2 \times (.14 - .05)] \\
 &= .05 + .108 \\
 &= .158
 \end{aligned}$$

*Terms are defined as follows:*

- krf = Risk-free rate of return (assumed to be 5%).  
 bi = Beta coefficient of stock (assumed to be 1.2).  
 PMR = Market risk premium.  
 Km = Market rate (assumed to be 14%).

## D. Weighted Average Cost of Capital (WACC)

The *weighted average cost of capital* is the sum of the weighted percentage of each form of capitalization used by a business. The optimum cost of capital is the combination of debt and equity securities (debt / equity ratio) that produces the lowest weighted average cost of capital.

### 1. Formula

$$\text{WACC} = \begin{array}{c} \text{Cost of equity multiplied} \\ \text{by the percentage equity} \\ \text{in capital structure} \end{array} + \begin{array}{c} \text{Cost of debt multiplied by} \\ \text{the percentage debt} \\ \text{in capital structure} \end{array}$$

### 2. Optimum Cost of Capital

The following graph illustrates the relationship between the weighted average cost of capital and the relationship between the elements of an entity's capitalization (the debt equity ratio).



## III. DISCOUNTED CASH FLOW

Discounted cash flow (DCF) valuation methods (including the net present value and the internal rate of return methods discussed below) are techniques that use time value of money concepts to measure the present value of cash inflows and cash outflows expected from a project.

### A. Factors

The following elements must be known:

1. Dollar amount of initial investment.
2. Rate of return desired for the project (discount rate).
3. Dollar amount of future cash inflows and outflows (net of related income tax effects).

#### IV. NET PRESENT VALUE (NPV)

The *net present value approach* is generally thought to be the best technique to evaluate capital projects.

##### A. General

##### 1. Characteristics

Net present value computations are based upon amounts (not percentages). The net present value method displays the net amount by which the present value of cash inflows exceeds—or does not exceed—the invested amount.

##### 2. Formula

Discounted cash flows	XXX
Less: Investment	<XXX>
NPV	<u>XXX</u>

##### 3. Conclusions

**Positive NPV** indicates that the proposed investment **exceeds the hurdle (minimum) rate** and the investment should be considered; investments that have a **negative NPV** should be **rejected**. A zero NPV indicates the proposed investment is expected to yield the **exact hurdle rate** of return.

#### V. INTERNAL RATE OF RETURN (IRR)

##### A. General

##### 1. Characteristics

The internal rate of return method computes the percentage rate of return on a specific investment for comparison to a company's target (hurdle) rate of return. The internal rate of return produces a NPV equal to zero.

##### 2. Limitations

Internal rate of return computations are less reliable than net present value computations when the investment alternative has variable cash flows. The IRR computation assumes reinvestment of earnings at the IRR, a rate that may be unrealistic. Interpolation and trial and error are required.

#### VI. PAYBACK METHODS

*Payback methods* may use either discounted or undiscounted approaches. The methods compute the number of years it will take to recoup the original investments.

##### A. Undiscounted Payback

##### 1. Characteristics

Payback methods are based upon periods of time, not amounts of dollars or percentage returns.

$$\frac{\text{Investment}}{\text{Average annual cash flows}} = \text{Payback period}$$

**2. Objectives and Limitations**

The undiscounted payback method ignores profitability and time value of money.

**B. Discounted Payback**

The *discounted payback method* is identical to the undiscounted method, except the after-tax cash flows are discounted in the computation for the number of years.

## NOTES



**MULTIPLE-CHOICE QUESTIONS****QUESTION 1**

Canine Industries anticipates investment in equipment designed to improve the efficiency of its operations. The company anticipates that the investment will generate \$10,000 in revenue in addition to producing annual cost savings of \$40,000. If the tax rate applicable to the company is 25%, what are the anticipated after-tax cash flows of the investment?

1. \$10,000
2. \$12,500
3. \$30,000
4. \$37,500

**QUESTION 2**

Gibson Enterprises issued 1,000 of its 8%, \$50 par value preferred shares for \$52 per share and incurred \$2,500 in flotation costs. What was Gibson's cost of equity capital?

1. 8.42%
2. 8.08%
3. 8.00%
4. 7.69%

**QUESTION 3**

SmallCap Corp. is a relatively new company whose limited number of low cost shares are actively traded on the NASDAQ. The value of the company's shares is fairly volatile and has fluctuated by 25% more than the overall fluctuation of the values of the total exchange. The company needs capital to expand and has been offered 12% financing by its bank. The company has the cash from accumulated earnings necessary for its expansion and currently has the funds in highly liquid risk-free, federally-insured securities yielding 2%. Management has elected to use the capital asset pricing model (CAPM) to compute its cost of capital to assist in evaluating financing alternatives. What is the cost of capital using the CAPM?

1. 2.00%
2. 12.00%
3. 14.50%
4. 17.00%

**QUESTION 4**

Expansion, Inc. is looking at a number of capital projects and is trying to determine the appropriate hurdle rate to use to ensure improvement of shareholder value. The company's after-tax cost of debt capital is 7% and it has reliably computed its cost of equity financing to be 12%. If the company's current debt to equity ratio is .25 and debt to total capital ratio is .2, what is the minimum hurdle rate Expansion, Inc. will use?

1. 9.5%
2. 10.75%
3. 11.00%
4. 12.00%

## QUESTION 5

Exeter Corporation has the opportunity to make a \$150,000 capital investment that management anticipates will produce a \$40,000 after-tax income stream in each of the next five years. The investment will have a 10% salvage value after taxes at the end of year five. The company's tax rate is 25% and the company's hurdle rate is 10%. What is the net present value of this investment given the following present value factors at 10%?

	<u>Present Value of \$1.00</u>	<u>Present Value of an Annuity</u>
Year 1	.909	0.909
Year 2	.826	1.736
Year 3	.751	2.487
Year 4	.683	3.170
Year 5	.621	3.791

1. (\$1,600)
2. \$1,600
3. \$9,315
4. \$10,955

## QUESTION 6

Xavier Exports has the opportunity to make a capital investment for \$200,000 that promises to provide after-tax cash flows of \$65,000 in each of the next two years and \$35,000 per year in years three through five. The investment has a 10 percent after-tax salvage value. If the tax rate is 25% and the anticipated hurdle rate is 9%, what is the net present value of the investment given the following discount factors at 9%?

	<u>Present Value of \$1.00</u>	<u>Present Value of an Annuity</u>
Year 1	.918	0.918
Year 2	.842	1.759
Year 3	.773	2.532
Year 4	.709	3.241
Year 5	.651	3.892

1. (\$11,028)
2. (\$4,080)
3. \$2,010
4. \$11,487

## QUESTION 7

Inexacta Enterprises wants to compute the payback on a \$100,000 capital investment that is projected to produce \$23,850 in after-tax cash inflows each year for the next five years and has a 7% salvage value at the end of the fifth year. What is the payback period in years?

1. 3.90
2. 4.19
3. 4.49
4. 5.93

## TASK-BASED SIMULATIONS

TASK-BASED SIMULATION: *Written Communication*

The new *staff member* at your company is confused about the underlying assumptions of net present value and internal rate of return calculations. As the manager, write a memo to the *staff member* describing the difference between the two techniques, as well as the advantages and disadvantages.

Type your communication in the response area below using the word processor provided.

**REMINDER:** Your response will be graded for both technical content and writing skills. Technical content will be evaluated for information that is helpful to the intended reader and clearly relevant to the issue. Writing skills will be evaluated for development, organization, and the appropriate expression of ideas in professional correspondence. Use a standard business memo or letter format with a clear beginning, middle, and end. Do not convey information in the form of a table, bullet point list, or other abbreviated presentation.

## MEMORANDUM

To: Staff Member  
Subject: NPV vs. IRR

[Response area]

Sincerely,  
  
*Manager*

TASK-BASED SIMULATION: *Solution*

## MEMORANDUM

To: Staff Member

Subject: NPV vs. IRR

Net present value and internal rate of return are two techniques that can be used to evaluate investment opportunities. The net present value method is generally considered to be superior to the internal rate of return method. However, each method has its advantages and disadvantages.

Net present value compares the present value of the cash inflows and outflows from an investment decision. Present value is calculated using a discount rate or hurdle rate chosen by management. An investment with a positive net present value should be accepted and an investment with a negative net present value should be rejected. This method provides an estimate of investment return in dollars and assumes that the cash flows from an investment are reinvested at the discount rate used in the analysis.

The net present value method is superior to the internal rate of return method because it is flexible. Net present value can handle uneven cash flows and the discount rate used to calculate present value can be adjusted for risk. Risk adjustments include assigning higher discount rates to higher risk investments and assigning different discount rates to each period of an investment based on relative risk. The limitation of the net present value method is that it does not provide the true rate of return on an investment.

An investment's internal rate of return is the discount rate that equates the present value of the investment's cash inflows and cash outflows. In other words, internal rate of return is the discount rate that yields a net present value of zero. An investment with an internal rate of return in excess of the hurdle rate should be accepted and an investment with an internal rate of return below the hurdle rate should be rejected.

The primary advantage of the internal rate of return method is that it measures return as a percentage that can be compared to the hurdle rate. However, internal rate of return has several limitations. This method assumes that the cash flows from the investment are reinvested at the internal rate of return. This is an unreasonable assumption if the internal rate of return is unrealistically high or low. In addition, internal rate of return is less reliable when investment cash flows are uneven and does not consider the total profitability of an investment.

Because of the relative advantages and disadvantages of these methods, our company generally evaluates potential investments using both methods. If the two methods result in conflicting investment decisions, we use the results of the net present value method to make the final decision.

Sincerely,

*Manager*

# BUSINESS 3B

## BUSINESS 3B

*Finance 2*

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- Specific Banking Procedures and Services Used to Affect Cash Management Strategies
  - Cash Discounts Used in Credit Terms
  - Inventory Management Techniques
    - Economic Value Added
    - Financial Ratios

## NOTES

## SUMMARY NOTES

**I. SPECIFIC BANKING PROCEDURES AND SERVICES USED TO AFFECT CASH MANAGEMENT STRATEGIES**

Cash management objectives include fee reduction, expediting deposits, and fraud protection.

**A. Fee Reduction****1. Compensating Balances**

Bank fees are waived when the customer maintains minimum account balances.

**2. Trade Credit**

*Trade credit* maximizes the availability of funding with no (or reduced) charges.

**3. Commercial Paper**

*Commercial paper* is a source of short-term financing by the issuer and an investment of idle cash by the buyer.

**B. Expedite Deposits****1. Zero-balance Account**

The *zero-balance account* maintains a zero balance at all times. Its use reduces the elapsed time for transfers between accounts and maximizes availability of idle cash.

**2. Electronic Fund Transfers (EFTs)**

*Electronic fund transfers* allow for direct deposit of funds.

**3. Lock Box System**

With a *lock box system*, customers send payments to a P.O. box or a location accessible by the bank.

**C. Fraud Protection**

Official bank checks (a.k.a. depository transfer checks) are designed to insulate the company from fraud and simplify bookkeeping.

**II. CASH DISCOUNTS USED IN CREDIT TERMS**

Different elements of working capital can be used to manage current position.

**A. Accounts Payable**

Cash discounts are frequently offered for early payment of accounts payable or receivable. The terms are stated with the percentage discount available if paid within a discount period along with the full term of the obligation. The term "*2/10, net 30*" indicates that payment within 10 days will earn a 2 percent discount, but that the full payment is due within 30 days. The cost of discounts not taken can be calculated using the following steps:

1. Compute the number of times the discount-forgone period occurs in a year:

Days per year  $\div$  Days outstanding after discount

For terms 2/10, net 30:

$$360 \text{ days per year} \div (30 \text{ days term} - 10 \text{ days discount}) = 360 \div 20 = 18$$

2. Compute the effective interest rate associated with discount forgone:

Discount % Offered / (100% - Discount % Offered)

For terms 2/10, net 30:

$$2\% \div (100\% - 2\%) = .020408$$

3. Annualize by multiplying the effective rate by the number of times the discount-forgone period occurs in a year:

$$.020408 \times 18 \text{ times} = 36.7\%$$

## B. Accounts Receivable

Accounts receivable can be **sold (factored)** to expedite cash collections.

## III. INVENTORY MANAGEMENT TECHNIQUES

Inventory management techniques focus on maintaining the minimum quantities on hand necessary to meet current needs.

### A. Just-in-Time

A *just-in-time inventory system* reduces the lag time between inventory arrival and inventory use, and it assumes zero defects.

### B. Economic Order Quantity (EOQ)

*Economic order quantity* formulates the order size that will minimize both ordering costs and carrying costs.

$$EOQ = \sqrt{\frac{2SO}{C}}$$

Terms are defined as follows:

- EOQ = Economic order quantity
- S = Annual sales in units.
- O = Cost per purchase order (primarily production set-up costs).
- C = Carrying cost per unit.

## IV. ECONOMIC VALUE ADDED

### A. Computation

1. Calculate the required return as follows:

$$\text{Investment} \times \text{Cost of capital} = \text{Required return}$$

2. Compare income after taxes to required return to determine economic value added.

$$\text{Income after taxes} - \text{Required return} = \text{Economic value added}$$



## V. FINANCIAL RATIOS

You must know the elements necessary to compute various *financial ratios*, understanding their meanings, and the appropriate context in which to use the ratios given certain facts and circumstances.

### A. Creditor Ratios

- Liquidity**—Measures a firm's short-term ability to meet its current obligations.

$$\bullet \text{ Current ratio} = \frac{\text{Current assets} \left( \text{Cash} + \frac{\text{Marketable securities}}{\text{securities}} + \text{Receivables} + \text{Inventory} + \frac{\text{Prepaid expenses}}{\text{expenses}} \right)}{\text{Current liabilities}}$$

$$\bullet \text{ Quick (acid - test) ratio} = \frac{\text{Cash} + \text{Marketable securities} + \text{Receivables}}{\text{Current liabilities}}$$

- Average Collection Period**

$$\bullet \text{ Receivable turnover} = \frac{\text{Net credit sales}}{\text{Average receivables}}$$

$$\bullet \text{ Average collection period} = \frac{365}{\text{Receivable turnover}}$$

$$\bullet \text{ Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory balance}}$$

$$\bullet \text{ Number of days sales in inventory} = \frac{365}{\text{Inventory turnover}}$$

**3. Solvency**—The measure of security for long-term creditors/investors.

- **Debt to equity ratio** =  $\frac{\text{Total debt}}{\text{Total shareholders' equity}}$

- **Debt to total asset ratio** =  $\frac{\text{Total debt}}{\text{Total assets}}$

**B. Investor Ratios**—Measures the financial success or failure of an enterprise for a given period.

**1. Profitability**

- **Gross margin** = Sales – Cost of goods sold

**2. Return on investment**

- **Return on (investment) total assets** =  $\frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}}$

**MULTIPLE-CHOICE QUESTIONS**

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**QUESTION 1**

A cash manager trying to increase the availability of cash would likely use any one of the following techniques or banking services, except:

1. Compensating balance arrangements.
2. Zero-balance account arrangements.
3. Electronic funds transfer agreements.
4. Lock box systems.

**QUESTION 2**

Efficiency Emporiums owns retail outlets exclusively devoted to the marketing and distribution of closet organizers that it purchases wholesale from a supplier. The company will sell 2,500 units in the coming year. The company has estimated that the cost of a purchase order is \$1,000, the per unit cost of carrying a unit of product in inventory is \$500 and that the stock out costs associated with inventory is \$25,000. What is the optimum inventory order for Efficiency Emporiums?

1. 100
2. 120
3. 208
4. 240

**QUESTION 3**

King Manufacturing has an investment in its Montana regional plant of \$900,000 after adjustments for capitalization of research and development costs and revaluation of certain assets. The company's cost of capital is 12%, and the plant produces a net income of \$500,000 after adjustments for current year research and development, asset revaluations, and other accounting considerations. What is the economic value added?

1. \$500,000
2. \$900,000
3. \$392,000
4. \$400,000

## QUESTION 4

XYZ Corporation had net credit sales of \$730,000 for the year ended December 31, Year 2, up over 8% from prior year levels of \$675,000. The company has experienced a nearly 15% increase in accounts receivable from \$41,000 at December 31, Year 1 to \$47,000 at December 31, Year 2. Management wants to know if the average collection for the current year has deteriorated from prior year levels of under 21 days. What is the average collection period in days for the year ended December 31, Year 2?

1. 16.59
2. 22.00
3. 22.86
4. 23.50

# BUSINESS 4A

## BUSINESS 4A

### *Information Systems and Communications 1*

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#### **Organizational Needs Assessment**

- Introduction to Information Systems and Communication
  - Data Capture
    - Processing
      - Reporting
- Role of Information Technology in Business Strategy

#### **Systems Design and Other Elements**

- Business Process Design
  - Information Technology (IT) Control Objectives
    - Role of Technology Systems in Control Monitoring
      - Operational Effectiveness
        - IT Responsibilities and Segregation of Duties
          - Policies

#### **Security**

- Technologies and Security Management Features
  - Policies

## NOTES

**ORGANIZATIONAL NEEDS ASSESSMENT****I. INTRODUCTION TO INFORMATION SYSTEMS AND COMMUNICATION****A. Information Technology**

Information technology (IT) is a term relating to the development, installation, and maintenance of computers, application systems, and the associated programs and telecommunications infrastructure. It also includes the data stored and transmitted and the people working in the industry. Today's economy could not exist without information technology. Information and technology requirements are specialized to each industry and business, and require careful needs assessment. Integral to the needs assessment is an understanding of the nature of data, information, and systems.

**B. Components of Information Technology**

1. There are five components of business information systems:
  - a. Hardware
  - b. Software
  - c. Network
  - d. People
  - e. Data/Information

**C. Roles of Business Information Systems****1. Primary Roles in Business Operations**

- a. To process detailed data, such as transactions
- b. To provide information for decision making
- c. To provide information for strategy development
- d. To take orders from customers

**2. Hierarchy of Roles**

- a. An entity's information system should capture and process detailed transaction data.
- b. The system should also provide higher level aggregated data for management decision making.

**3. Information Systems**

These may be viewed from a *functional perspective* as follows:

- a. Sales and marketing systems
- b. Manufacturing and production systems
- c. Accounting and finance systems
- d. Human resource systems

## II. DATA CAPTURE

When processing business transactions, the first step is to capture the data pertaining to the transaction and then enter the data into the system.

- A. A business event or transaction is necessary for the data capture process.
- B. Computer data is captured through manual entries or source data automation devices.
- C. To ensure that data is accurate and complete, the entity uses well-designed input screens and auto-entry fields.

## III. PROCESSING

### A. Functions Performed on Data

Information is data that has been processed in some manner. Business information systems allow a business to perform the following functions on data:

- 1. Collect
- 2. Process
- 3. Store
- 4. Transform
- 5. Distribute

### B. Accounting Information Systems (AIS)

- 1. Objectives of an entity's AIS include:
  - a. recording valid transactions.
  - b. properly classifying those transactions.
  - c. recording transactions at their proper value.
  - d. recording transactions in the proper accounting period.
  - e. properly presenting the transactions and related information in the financial statements.
- 2. Transactions or events may be processed through five primary transaction cycles:
  - a. Revenue cycle
  - b. Expenditure cycle
  - c. Production cycle
  - d. Human resource/payroll cycle
  - e. Financing cycle
- 3. Sequence of events in an AIS:
  - a. Transaction data entered by an end user or via the Internet by a customer
  - b. Transactions are journalized and posted to ledgers
  - c. Trial balance is prepared
  - d. Adjustments, accruals and corrections are recorded
  - e. Financial reports are produced



**C. Data Processing Cycle**

1. The data processing cycle consists of four functional areas.
  - a. *Data input via manual source document input or electronic data capture* (e.g., from web transactions). All transactions are entered, for the correct amounts and into the correct accounts.
  - b. *Data storage* which includes the following methods of keeping data organized and available for retrieval:
    - (1) Journals and ledgers.
    - (2) Coding: Sequential, block and group codes (to give a structured and logical framework to the data and make it more accessible and useful).
    - (3) Chart of accounts (summary of data by ledger classification).
    - (4) Files (input files, transaction files, master files, databases) .
  - c. *Data processing* including batch processing and on-line real-time processing.
  - d. *Information output* in the form of documents, queries and reports.
2. A well-designed AIS creates an audit trail for accounting transactions, which allows a user to trace a transaction from a source document to the ledger and from the ledger back to the source documents. This is particularly important for auditing.

**D. Processing Methodology****1. Batch Processing**

In batch processing, data (normally transactions) is processed in batches or groups with the database or databases updated only on a periodic (e.g., daily, monthly, etc.) basis. There is always some kind of delay, however short, in batch processing.

**2. Online Real Time (OLRT) Processing**

With OLRT processing, there is instantaneous processing and updating of the database or databases. Some application systems are combinations of batch processing and online processing, sometimes with online processing for transaction input and batch processing for updates and report creation, and sometimes with online processing for transaction input and processing and batch processing only for interfaces to other application systems. OLRT systems require random access storage devices, whereas batch processing systems do not.

- a. Examples of an OLRT processing system include an airline ticket reservation system and a point-of-sale system used by a mass merchandiser. (With a point-of-sale system, there is instant updating of sales and inventory data at the time the sale is recorded (scanned) by a cashier.)

**E. Centralized vs. Decentralized (Distributed) Processing****1. Centralized Processing**

Centralized processing maintains all data and performs all data processing at a central location.

**2. Decentralized (Distributed) Processing**

With decentralized (distributed) processing, computing power, applications, and processing are spread over more than one processor or location. Various degrees of centralized and decentralized processing exist but, theoretically, anything not totally centralized is decentralized.

**3. Advantages of Centralized Processing**

- a. Better data security (because data and programs are in one place).
- b. Consistent processing (because the processing is only done in one place by one set of applications; one of the biggest problems with decentralized processing is keeping the various decentralized applications the same).

**4. Disadvantages of Centralized Processing**

- a. High transmission costs
- b. Increased processing power/storage for the central processor
- c. Reduction in local accountability
- d. Input and output bottlenecks are possible
- e. Delay in response time to remote locations
- f. Increased vulnerability to problems occurring at the central location

**F. End-User Computing (EUC)**

EUC involves hands-on use of computers by functional end users who perform their own information processing activities with hardware, software and professional resources provided by the organization. EUC includes development of applications (such as spreadsheets and databases) and data input and report generation.

**IV. REPORTING**

Reports are prepared for both internal and external users. Reports are used by employees to control operational activities and by managers to make decisions and to design strategies for the business.

**A. Types of Reports****1. Periodic Scheduled Report**

Example: A general ledger and budget versus actual reports produced each month.

**2. Exception Report**

Example: Variance analysis that captures performance at variance from specific standards.

**3. Demand Report**

Example: Individual account analyses produced only when requested.

**4. Ad Hoc Report**

Example: Analysis of sales by region by product by month (also often known as a "query").

**5. Push Report**

Example: A report sent via e-mail by the material requisition department to the plant manager showing a late shipment by a supplier.

**6. Dashboard-Style Report**

Example: Analysis of risk profile in comparison to risk tolerances.

**V. ROLE OF INFORMATION TECHNOLOGY IN BUSINESS STRATEGY**

- A. Technology is a core input to the development of strategy.
- B. Due to the speed at which technology changes, strategy development must be a continual process.
- C. Technology plays an important role in enabling the flow of information in an organization, including information directly relevant to enterprise risk management across strategy setting and the whole organization.

## SYSTEMS DESIGN AND OTHER ELEMENTS

### I. BUSINESS PROCESS DESIGN (*integrated systems, automated and manual interfaces*)

#### A. Categories of Business Information Systems

##### 1. Transaction Processing Systems

Transaction processing systems process and summarize individual routine transactions necessary to conduct business (e.g., a payroll system or an accounts payable system).

##### 2. Management Information Systems (*MIS*)

Management information systems provide comprehensive processing and summarizing of data (e.g., a general ledger system that includes subsidiary accounting and cost ledger data processing). A general ledger system would also be a transaction processing system and an accounting information system; the various categories are not mutually exclusive.

##### 3. Decision Support Systems (*DSS*)

Decision support systems assist with analysis and presentation of data for specific decisions (e.g., a system that assists sales personnel with bidding on jobs).

##### 4. Executive Information Systems (*EIS*)

Executive information systems summarize data for executive management (e.g., dashboard reporting of key indicators).

#### B. System Development Life Cycle (*SDLC*)

- The life cycle concept provides a framework for planning and controlling detailed developmental activities.
- This cycle is a multistep process used by organizations to implement a new, well-designed AIS (accounting information system). Remember the steps using the mnemonic, **A DITTO**.

##### a. System Analysis

During system analysis, the information needed to purchase or develop a new system is gathered.

##### b. Conceptual and Physical Design

During the conceptual design, the company decides how to meet user needs. A physical design is then performed by the company, which includes developing detailed specifications used to code and test the computer programs.

##### c. Implementation and Conversion

All the elements and activities of the system come together during the implementation and conversion process.

##### d. Training

Training programs are developed which include hardware/software skill training and orientations to new policies/procedures.

##### e. Testing

System testing includes testing the effectiveness of user input, operating and control procedures, processing procedures, computer programs, and system reports (output).

##### f. Operations and Maintenance

During its life, the system is periodically reviewed and modifications are made to solve any problems that occur or to improve the system.

### C. Participants in Business Process Design

1. The business process design team includes the following members:
  - a. Management (its most important role is to provide support and encouragement for development projects and to align information systems with corporate strategies).
  - b. Accountants (may be users and should help to determine system requirements; may be on the development team; should take an active role in designing system controls).
  - c. Information systems steering committee (executive level project steering committee).
  - d. Project development team (responsible for development as well as technical implementation and user acceptance).
  - e. External parties (Major customers or suppliers).

## II. INFORMATION TECHNOLOGY (IT) CONTROL OBJECTIVES

The *Control Objectives for Information and Related Technology* (COBIT) provides managers, auditors, and IT users with a set of measures, indicators, processes and best practices to maximize the benefit of information technology. The COBIT framework includes the following:

### A. Business Objectives

These might include but are not limited to:

1. Effective decision support
2. Efficient transaction processing
3. Compliance with reporting requirements or information security requirements

### B. Governance Objectives

These focus on the following five areas related to IT governance:

1. Strategic alignment
2. Value delivery
3. Resource management
4. Risk management
5. Performance measurement

### C. Information Criteria

Seven distinct criteria exist that describe the COBIT business requirements pertaining to information. The information criteria can be remembered using the mnemonic, **ICE RACE**, as follows:

1. **I**ntegrity
2. **C**onfidentiality
3. **E**fficiency
4. **R**eliability
5. **A**vailability
6. **C**ompliance
7. **E**ffectiveness

**D. IT Resources**

These consist of applications, information (input/output), infrastructure, and people. The IT resources and the processes are referred to as the *enterprise architecture* for IT.

**E. Domains and Processes of COBIT**

COBIT defines IT processes within the context of the following four domains, which direct the delivery of solutions and services and ensure the directions are followed:

1. Plan and Organize (Direct)
2. Acquire and Implement (Solution)
3. Deliver and Support (Service)
4. Monitor and Evaluate (Ensure Directions Followed)

**III. ROLE OF TECHNOLOGY SYSTEMS IN CONTROL MONITORING****A. General and Application Controls****1. General Controls**

*General controls* are designed to make sure an organization's control environment is stable and well-managed. Some of the more important general controls are system development standards, security management controls and change management procedures, as well as software acquisition, development, operations, and maintenance controls.

**2. Application Controls**

*Application controls* prevent, detect, and correct transaction error and fraud. They are concerned with accuracy, completeness, validity, and authorization of the data captured, entered into the system, processed, stored, transmitted to other systems, and reported.

**B. Input Controls**

*Input controls* verify that transaction data is valid, complete, and accurate. Input controls may include data validation at the field level, prenumbered forms, and well-defined source data preparation procedures.

**C. Processing Controls**

*Processing controls* verify that all transactions are processed correctly during file maintenance. Key processing controls include data matching, use of file labels, recalculation of batch totals, cross-footing and zero-balance tests, write-protection mechanisms, and data processing integrity procedures.

**D. Output Controls**

*Output controls* verify the accuracy and integrity of reports. Output controls include user review of output, reconciliation procedures, external data reconciliation, and output encryption.

**E. Managing Control Activities**

The entity should establish controls related to the use of information technology resources. This includes creating budgets for the acquisition of computer equipment and software, for operating costs, and for usage. The entity should compare budgeted amounts to actual amounts and then investigate any material discrepancies.

## IV. OPERATIONAL EFFECTIVENESS

### A. Overview

Evaluating the ongoing effectiveness of control policies and procedures provides added assurance that controls are operating as prescribed and achieving their intended purpose. A diagnostic control system compares actual performance to planned performance.

### B. Control Effectiveness

To minimize failures and reduce cost overruns, while substantially improving system efficiency and effectiveness, the following principles of control should be applied to systems development:

1. *Strategic Master Plan*—Developed and updated yearly. It shows the projects that must be completed to achieve long-range company goals and addresses the company's hardware, software, personnel, and infrastructure requirements.
2. *Data Processing Schedule*—To maximize the use of scarce computer resources, all data processing tasks should be organized according to a data processing schedule.
3. *Steering Committee*—Should be formed to guide and oversee systems development and acquisition.
4. *System Performance Measurements*—For a system to be evaluated properly, it must be assessed using system performance measurements.

## V. IT RESPONSIBILITIES AND SEGREGATION OF DUTIES

### A. Roles and Responsibilities of Information Technology Professionals

The roles and responsibilities of IT professionals are defined by individual organizations, and job titles and responsibilities can vary widely.

#### 1. Executive

Executive roles include chief information officers (CIOs) and chief technology officers (CTOs).

#### 2. Management

Management includes senior IT executives, directors, and managers who usually report to the CIO or CTO. Titles in the real world can vary widely and do not necessarily indicate specific functions.

#### 3. Programmers/Administrators/Analysts

- a. System analysts.
- b. Application programmers.
- c. System programmers. (In mainframe environments, system programmers maintain the operating system; in non-mainframe environments, operating system maintenance may be done by a system administrator. The functions can be essentially the same even if the titles are different.)
- d. Security administrators.
- e. Database administrators (are different from data administrators).

### B. Segregation of Duties within Information Technology

1. Segregation of duties is defined as dividing responsibilities for different portions of a transaction (authorization, recording, and custody) among several different people or departments.
2. Within the IT department, the duties of system analysts and computer programmers, computer operators, and security administrators should be kept separate as much as possible.

## VI. POLICIES

Authority and responsibility are assigned through formal job descriptions, employee training, operating plans, schedules and budgets, a formal company code of conduct, and a written policy and procedures manual.

## SECURITY

### I. TECHNOLOGIES AND SECURITY MANAGEMENT FEATURES

#### A. Safeguarding Records and Files

Data can be protected by using internal/external labels and file protection rings. An off-site location should be used to back up data on all critical applications.

#### B. Backup Files

Data backups are required for recovery in a disaster scenario and for recovery from processing problems. The company should store copies of key master files and records off-site with copies of files kept on-site stored in fireproof containers or rooms.

#### C. Uninterrupted Power Supply (UPS)

UPS is a device that maintains a continuous supply of electrical power to connected equipment. Also called a battery backup, a UPS can prevent data loss and can protect the integrity of a backup while it is being performed.

#### D. Program Modification Controls

Program modification controls are controls over changes to programs being used in production applications. It is used to prevent changes by unauthorized personnel and to track program changes so that there is record of what version of a program is running in production at a given point in time.

#### E. Data Encryption

Data security is a central issue for information technology. Encryption of data or information attempts to ensure data security by scrambling information to make it unreadable without an access code (key).

##### 1. Encryption methods include:

- a. Encryption keys (used to scramble and unscramble the data; the longer, the better; a popular one is 128 bits).
- b. Digital certificates (an electronic document that is digitally signed by a trusted party).
- c. Digital signatures (a signature in an electronic form to identify the sender and ensure that the message has not been changed).
- d. E-signatures (a legally-binding cursive-style imprint of a person's name applied to an electronic document).
- e. None of these methods are foolproof; hackers are always trying to find ways around them.

**F. Password Management**

A password management policy must address the following password characteristics:

1. *Password Length*—the longer, the better. It must be greater than seven characters. Most organizations require at least eight characters.
2. *Password Complexity*—Complex passwords feature three of the following four characteristics: uppercase characters, lowercase characters, numeric characters, and ASCII characters (e.g., ! @ # \$ % ^ & \* or ?).
3. *Password Age*—The NSA (National Security Agency) recommends that passwords should be changed every 90 days. Administrative passwords should be changed more frequently.
4. *Password Reuse*—Although there is no true standard, passwords should not be reused until a significant amount of time has passed. The goal is to prevent users from alternating between their favorite two or three passwords.

**G. User Access**

User accounts are the first target of a hacker who has gained access to an organization's network. Diligent care must be used when designing procedures for creating accounts and granting access to information.

**II. POLICIES****A. Security Policy**

Information security policy can be defined as a document that states how an organization plans to protect its tangible and intangible information assets. An information security policy includes the following:

1. Management instructions indicating a course of action, a guiding principle, or an appropriate procedure.
2. High-level statements that provide guidance to workers who must make present and future decisions.
3. Generalized requirements that must be written down and communicated to certain groups of people inside, and in some cases outside, the organization.



**MULTIPLE-CHOICE QUESTIONS****QUESTION 1**

Houston Corporation is planning to implement a new information system. Which of the following statements is/are correct?

- I. Houston's requirement for an accounting information system will preclude it from implementing a transaction processing system.
  - II. If Houston implements an executive information system, the system will provide top executives with access to information to assist those executives in monitoring business conditions.
  - III. Whichever system Houston implements, the system may be implemented for a specific part of the business or for the business as a whole as an enterprise system.
1. I, II, and, III are correct.
  2. I and II only are correct.
  3. II and III only are correct.
  4. II only is correct.

**QUESTION 2**

Macedonia Corporation's mainframe programming and operations staff is in an uproar. They have heard that the internal auditors are planning to insist upon all sorts of controls on the systems and programming activity, and they feel that these controls will cause them nothing but trouble. What sort of controls might Macedonia's internal auditors reasonably require?

- I. Input controls that require that certain key data be validated.
  - II. Input controls that require that all input data be processed in batches and that batch totals be maintained and verified for all batches.
  - III. Output controls that require that all reports be printed and manually distributed to end users through inter-office mail.
1. I, II, and III are correct.
  2. I and II only are correct.
  3. I only is correct.
  4. II only is correct.

**QUESTION 3**

Recent developments on the tractor market have caused regional sales of tractors to increase. Managers are trying to find out why and have requested reports that accumulate a variety of statistics regarding sales in the region by first time buyers, general population growth, comparative per capita income, and comparative data relative to sales by individual sales representatives etc. Managers are asking for:

1. An exception report.
2. An ad hoc report.
3. A periodic scheduled report.
4. A demand report.

**QUESTION 4**

Oily Gulch Drilling Company has designed a system to evaluate drilling sites. The system considers a wide array of geological and geophysical information as well as recent discoveries to determine the likelihood of successful drilling. This system is most likely considered to be a:

1. Decision support system.
2. Transaction processing system.
3. Executive information system.
4. Management information system.

**QUESTION 5**

One of the most effective ways to generate systems development support is a clear signal from top management that user involvement is important. Accountants may play three roles during systems design. Which of the following is not one of those roles?

1. As AIS users, they must determine their information needs and system requirements and communicate them to system developers.
2. As members of a project development team or information systems steering committee, they help manage system development.
3. Accountants should take an active role in designing system controls and periodically monitoring the system to verify that the controls are implemented and functioning properly.
4. As members of project development team, they are in charge of leading the information systems department with each of their functions.

**QUESTION 6**

Which of the following statements is true about encryption keys?

1. The longer the length of the key, the more confusing it is and the less effective it becomes.
2. One of the most popular encryption methods uses a key length of 288 bits.
3. In a brute-force attack, the attacker simply tries to physically break the web server.
4. By maintaining the private key as a secret, access is limited, but it does not mean the communication is perfect or that hackers are not trying to develop software that would break encryption schemes.

# BUSINESS 4B

## BUSINESS 4B

### *Information Systems and Communications 2*

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#### **The Internet: Implications for Business**

- ✦ Electronic Commerce and Business
  - ✦ Electronic Data Interchange
- ✦ Opportunities for Business Process Reengineering
  - ✦ Business-to-Business
    - ✦ B2B vs. B2C
  - ✦ Enterprise Resource Planning Systems
  - ✦ Supply Chain Management Systems
  - ✦ Customer Relationship Management Systems
  - ✦ Other E-Commerce Technologies
- ✦ Effect of Internet Evolution on Business Operations and Organization Cultures
  - ✦ Various Definitions

#### **Types Of Information Systems and Technology Risks**

- ✦ Risk Event Identification
- ✦ Threats in a Computerized Environment
- ✦ Risk Assessment and Control Activities
  - ✦ Access Controls

#### **Disaster Recovery and Business Continuity**

- ✦ Alternative Processing Facilities
- ✦ Types of Off-site Locations

#### **Appendix: IT Fundamentals**

- ✦ IT Fundamentals
- ✦ Databases/Database Management Systems

## NOTES

**THE INTERNET: IMPLICATIONS FOR BUSINESS****I. ELECTRONIC COMMERCE AND BUSINESS****A. E-Commerce**

The term e-commerce (or electronic commerce) is the electronic completion of buying and selling (exchange) transactions. E-commerce can use a private network or the Internet.

**B. E-Business**

The term e-business (or electronic business) is a more general term than e-commerce and represents any use of information technology, especially networking and communications technology, to perform business processes in electronic form.

**II. ELECTRONIC DATA INTERCHANGE (EDI)****A. Overview**

EDI is a computer-to-computer exchange of business transaction documents. It can occur when there are direct links between trading partners, either through communication intermediaries such as VANs or over the Internet. EDI requires that all transactions be submitted in a standard data format. The biggest risk associated with the use of EDI is unauthorized access to the organization's systems.

**B. Features of EDI**

1. Allows the transmission of electronic documents between computer systems in different organizations.
2. Reduces handling costs and speeds transaction processing versus traditional paper-based processing.
3. Requires that all transactions be submitted in a standard data format.
4. EDI can be implemented using direct links between the trading partners, through communication intermediaries, through VANs or over the Internet.

**C. Costs of EDI**

1. Legal (there must be an existing commercial relationship).
2. Hardware.
3. Translation software (there is a specific defined format for an industry for each type of transaction; the organization's internal format must be converted into or from the specific EDI format).
4. Data transmission.
5. Security, monitoring, and control (there has to be monitoring).

**D. Comparison of EDI and E-Commerce**

1. *Cost*—EDI is more expensive than e-commerce.
2. *Security*—EDI is more secure than e-commerce.
3. *Speed*—EDI is slower (Batch) than e-commerce (OLRT).
4. *Network*—EDI uses VAN (private) while e-commerce uses the Internet (public).

### III. OPPORTUNITIES FOR BUSINESS PROCESS REENGINEERING

#### A. Overview

*Business process reengineering* (BPR) is the analysis and redesign of business processes and information systems to achieve significant performance improvements. In essence, BPR simplifies the system, makes it more effective, and improves a company's quality and service.

#### B. Challenges Associated with BPR

1. Tradition (requires changes to existing organization's culture)
2. Resistance to change
3. Time and cost requirements (usually takes two or more years)
4. Lack of management support (must have or reengineering could fail)
5. Skepticism
6. Retraining
7. Controls (to ensure reliability and integrity of system intact)

### IV. BUSINESS-TO-BUSINESS (B2B)

#### A. Types

1. **Business to Consumer (B2C)**  
Retailers such as Amazon are B2C applications.
2. **Business to Business (B2B)**  
Purchasing systems linked with supplier systems are B2B applications.
3. **Consumer to Consumer (C2C)**  
Consumer auctions such as eBay are C2C applications.

#### B. Advantages of B2B

1. **Speed**  
The speed of the transaction is faster.
2. **Timing**  
Transactions can occur "24/7," anytime, anywhere.
3. **Personalization**  
Personalization by customers is possible.
4. **Security**  
Transactions can be secure because private information can be encrypted.
5. **Reliability**  
There is reduced human error when sellers deal directly with buyers without intermediaries.

#### C. Factors to Consider

An organization should consider the following factors when deciding when and how to engage in electronic commerce.

1. Selection of the business model
2. Channel conflicts (the potential of stealing business from existing sales/channels)
3. Legal issues
4. Security

## V. B2B VS. B2C

- A. B2B is more complex than B2C.
- B. B2B transactions often involve more participants for each transaction and more complex products than B2C.
- C. The payment mechanism for B2B is more complex than those for B2C.
- D. B2B payments may involve negotiation and invoicing, while B2C payments are made at the point of sale (immediately).

## VI. ENTERPRISE RESOURCE PLANNING SYSTEMS (ERP)

An *enterprise resource planning system* (ERP) is a cross-functional enterprise system that integrates and automates the many business processes and systems that must work together in the manufacturing, logistics, distribution, accounting, finance, and human resource functions of a business.

## VII. SUPPLY CHAIN MANAGEMENT SYSTEMS (SCM)

*Supply chain management* (SCM) is the integration of business processes from the original supplier to the customer and includes purchasing, materials handling, production planning and control, logistics and warehousing, inventory control, and production distribution and delivery. An entity's SCM system may perform some or all of these functions.

## VIII. CUSTOMER RELATIONSHIP MANAGEMENT SYSTEMS (CRM)

*Customer relationship management systems* (CRM) provide sales force automation and customer services in an attempt to manage customer relationships. The objective of a CRM system is to increase customer satisfaction, which can lead to increased revenue and profitability.

## IX. OTHER E-COMMERCE TECHNOLOGIES

### A. Electronic Funds Transfer (EFT)

Electronic funds transfer systems are a major form of electronic payment for the banking and retailing industries and are critical to e-commerce (e.g., paying for a book on Amazon by using a credit card). EFT security is normally provided through various types of data encryption. A third-party vendor acts as an intermediary between the user company and the banking system.

### B. Application Service Providers (ASP)

Application service providers supply access to application programs on a rental basis. They allow smaller companies to avoid the extremely high cost of owning and maintaining today's application systems by allowing them to pay only for what is used. The ASPs own and host the software.

## X. EFFECT OF INTERNET EVOLUTION ON BUSINESS OPERATIONS AND ORGANIZATION CULTURES

### A. Web 2.0

Web 2.0 emerging technologies have had a considerable impact on e-commerce. In its earlier years, the Internet was mostly a repository of documents that Web surfers could browse. However, technology advances led to the development of "Web 2.0," in which Web surfers began to interact through websites.

### B. Mash-ups

Mash-ups are Web pages that are collages of other Web pages and other information (e.g., Google maps).

**C. Web Stores**

Many smaller companies have *stand-alone Web stores* that are not integrated with larger accounting systems. In contrast, many larger companies and some smaller companies use integrated ERP systems that integrate all major accounting functions and the Web store into a single software system (termed *integrated Web stores*).

**D. Cloud Computing**

Cloud computing involves virtual servers over the Internet. A primary advantage of cloud computing is that it can offer professional management of hardware and software. Cloud computing includes infrastructure-as-a-service, platform-as-a-service, and software-as-a-service. Cloud providers must have sophisticated backup procedures as well as high level security for customer data.

**XI. VARIOUS DEFINITIONS****A. Internet**

The Internet is a network of interconnected computers. It is a network of networks, which are the actual physical hardware. The Internet and the World Wide Web (www or the Web) are sometimes used as synonyms, but they are not the same. The web is a collection of interconnected documents and resources that are linked by hyperlinks and URL (uniform resource locators). The web uses the Internet, as do e-mail and other applications. The Internet uses a transmission/communication protocol called Transmission Control Protocol/Internet Protocol (TCP/IP).

**B. Hypertext Markup Language (HTML)**

*Hypertext markup language* (HTML) is a tag-based formatting language used for Web pages.

**C. Hypertext Transfer Protocol (HTTP)**

*Hypertext transfer protocol* (HTTP) is a communications protocol used to transfer Web pages on the World Wide Web.

**D. URL**

The technical name for a web address is the *uniform resource locator* (URL), which consistently directs the user to a specific location on the web. A web address is composed of a number of features including the transfer protocol and the domain name. Web addresses include the following (many web addresses are considerably more complex than this example):

1. Transfer protocol, such as `http://` (Hypertext Transfer Protocol) or `ftp://` (File Transfer Protocol)
2. Server, such as `www` (indicates a web server)
3. Domain name, such as `Becker` (`Becker` is the subdomain name and `Becker.com` is the full domain name)
4. Top-level domain, such as `.com`, `.net`, `.edu` (often called generic top level domains)
5. Country, such as `.us`, `.de`, `.fr`, `.it` (often called country code top level domains)
6. Example: `http://www.becker.com.us` (the `.us` is generally not needed)

**E. TCP**

*Transport control protocol* (TCP) is the transmission protocol of the Internet protocol suite.



## TYPES OF INFORMATION SYSTEMS AND TECHNOLOGY RISKS

### I. RISK EVENT IDENTIFICATION

Risks can be assessed and to some extent managed. Access, data, and procedural controls are all important tools of risk management.

#### A. Types of Risks

##### 1. Strategic Risk

Strategic risk includes the risk of choosing an inappropriate technology.

##### 2. Operating Risk

Operating risk includes the risk of doing the right things in the wrong way.

##### 3. Financial Risk

Financial risk includes the risk of having financial resources lost, wasted, or stolen.

##### 4. Information Risk

Information risk includes the risk of loss of data integrity, incomplete transactions, or hackers.

##### 5. Specific Risks

Risks can be divided into the categories of errors, intentional acts, and disasters.

### II. THREATS IN A COMPUTERIZED ENVIRONMENT

#### A. Virus

A virus is a piece of computer program that inserts itself into some other program, including an operating system, to propagate. It requires a host program to propagate it, so it cannot run independently.

#### B. Worm

A worm is a program (and a special type of virus) that can run independently and normally propagates itself over a network. It cannot attach itself to other programs.

#### C. Trojan Horse

A Trojan horse is a program that appears to have a useful function but that contains a hidden and unintended function that presents a security risk. A Trojan horse normally does not replicate itself.

#### D. Denial-of-Service Attack

In a denial-of-service attack, one computer bombards another computer with a flood of information intended to keep legitimate users from accessing the target computer or network.

#### E. Phishing

Phishing is the sending of phony e-mails to try to lure people to phony websites asking for financial information.

### III. RISK ASSESSMENT AND CONTROL ACTIVITIES

#### A. Definitions

##### 1. Risk

In general, a risk is the possibility of harm or loss.

##### 2. Threat

A threat is any eventuality that represents a danger to an asset or a capability linked to hostile intent.

**3. Vulnerability**

For business information systems, vulnerability is a characteristic of a design, implementation, or operation that renders the system susceptible to a threat.

**4. Safeguards and Controls**

Safeguards and controls are policies and procedures that, effectively applied, reduce or minimize vulnerabilities.

**B. Risk Assessment**

The steps in risk assessment are to identify the risks, to evaluate the risks in terms of the probability of occurrence, to evaluate the exposure (in terms of potential loss) from each risk, to identify the controls that could guard against the risks, to evaluate the costs and benefits of implementing the controls, and to implement the controls that are cost-effective.

**IV. ACCESS CONTROLS****A. Physical Access**

Physical access to computer rooms should be limited to computer operators and other personnel of the IT department. To restrict access to computer rooms, the entity should require specially coded ID cards or entry keys.

**B. Electronic Access**

To circumvent unauthorized access to electronic data and application programs, the entity may use the following data access controls.

1. User identification codes
2. File level access attributes (control the privileges a user has to a file)
3. Assignment and maintenance of security levels
4. Callbacks on dial-up systems (to verify user before data access is allowed)
5. File attributes (used to restrict writing, reading or directory privileges for a file)
6. Firewalls (a system involving user identification and authentication that prevents unauthorized users from gaining access to network resources)

**DISASTER RECOVERY AND BUSINESS CONTINUITY****I. ALTERNATIVE PROCESSING FACILITIES****A. Disaster Recovery**

Disaster recovery consists of plans for continuing operations in the event of destruction of programs, data, and processing capability. Depending upon the organization, the disaster recovery plan may be limited to the restoration of IT processing or may extend to restoration of functions in end user areas (sometimes called a business continuity or business recovery plan).

**1. Major Players**

- a. The organization itself.
- b. Application software vendors (who may need to provide replacement application software).
- c. IT and business area personnel (business area personnel are often forgotten, but somebody has to do the work after the ability to process data is restored).

- d. Disaster recovery service provider (who is happy to provide disaster recovery services for a fee).
- e. Provisions/hardware vendors (replacement hardware or supplies may be needed).
- f. Senior management (who must support the disaster recovery plan or nothing will happen).

## 2. Steps in Developing a Disaster Recovery Plan

- a. Assess risks.
- b. Identify mission-critical applications.
- c. Determine responsibilities of the personnel.
- d. Develop a plan.
- e. Test the plan.

## B. Types of Disaster Recovery

### 1. Use of a Disaster Recovery Service

Some organizations contract with outside providers for disaster recovery services; the major factor under consideration is available hardware and telecommunication services.

### 2. Internal Disaster Recovery

Some organizations that require instantaneous resumption of processing after a disaster (e.g. banks, brokerage houses) provide their own duplicate facilities in separate locations.

### 3. Multiple Data Center Backups

Some organizations with multiple data centers plan to use one data center to back up another, assuming there is enough capacity to process the essential applications. Several types of backups can be used to recover lost data, including:

#### a. Full Backup

A *full backup* is an exact copy of the entire database. Full backups are time-consuming, so most organizations only do full backups weekly and supplement them with daily partial backups.

#### b. Partial Backup

There are two types of *partial backups* possible:

- (1) An *incremental backup* involves copying only the data items that have changed since the last backup. This produces a set of incremental backup files, each containing the results of one day's transactions.
- (2) A *differential backup* copies all changes made since the last full backup. Thus, each new differential backup file contains the cumulative effects of all activity since the last full backup. Consequently, except for the first day following a full backup, daily differentials backups take longer than incremental backups.

## II. TYPES OF OFF-SITE LOCATIONS

### A. Cold Site

A *cold site* is a disaster recovery facility that does not have equipment and operating system software available. All that is provided is the infrastructure. The organization must provide everything else.

### B. Hot Site

A *hot site* is a disaster recovery facility that does have equipment and operating system software available. The client must provide its application software and its data, and may provide its own operating system software in addition to the base operating system (all operating systems are not the same). Processing is normally restored faster with a hot site than with a cold site. Hot sites cost more than cold sites. There can also be situations where entire data centers are replicated for instantaneous recovery or transfer of operations (this does not come cheaply).

**C. Warm Site**

A *warm site* is a facility that is already stocked with all the hardware that it takes to create a reasonable facsimile of the primary data center. The advantage of the warm backup site is that restoration can be accomplished in a reasonable amount of time. The disadvantage is the cost of maintaining a contract with the facility to keep hardware up-to-date with that which is found in the organization's data center. The warm backup site is the compromise between the hot backup site and the cold backup site.

**APPENDIX: IT FUNDAMENTALS****I. IT FUNDAMENTALS****A. Hardware**

Hardware refers to the physical components of a computer.

**1. Internal Hardware**

- a. Central processing unit (*CPU*)
- b. Motherboard (*PCs*)
- c. Memory
- d. Storage (disk drives and similar hardware such as CD-ROM drives)
- e. Expansion cards (*PCs*: expansion cards are plugged into the motherboard)

**2. External Hardware (*Peripherals*)**

- a. Input devices (keyboards, mice, etc.)
- b. Storage (disk drives and similar hardware such as flash drives)
- c. Display (monitor)
- d. Output devices (printers, etc.)

**3. Classes of Processors**

Classes of processors in a business environment can be separated based on overall processing power and include mainframes, midrange and minicomputers, and personal computers.

**B. Software**

Software is a specific program used to control computer hardware, user interface, data collection and manipulation, and internal and external communications. Software makes hardware do something useful.

**1. System Software**

System software consists of the programs that run the computer and support system management operations.

**a. Operating System**

The *operating system* is the software that controls the hardware and the applications environment. Examples of common operating systems for PCs and other small processors are Microsoft Windows®, Linux, Unix, and Mac. Another term for the operating system is system software.

**b. Database Management System (*DBMS*)**

For a more detailed discussion, see section II below.

## 2. Programming Languages

Programming languages like COBOL, Pascal, Basic and Visual Basic, and C and C++ allow programmers to write programs in source code. The source code is then translated into machine language. Machine languages tell the hardware how to work and are specific to types of processors (machines).

## 3. Application Software

Application software is generally utilized by the end user to accomplish specific functions. Common application software includes Microsoft Excel (electronic spreadsheet), Peachtree Accounting (general ledger and subsidiary ledger accounting), and SAP (comprehensive enterprise resource planning). Application software runs "on top of" the operating system.

## C. Networks

### 1. Overview

A *network* is a group of interconnected computers, terminals, communications channels, communication processors, and communications software. Networks are linked using various types of communication devices, including modems, PC cards (also known as Personal Computer Memory Card International Association, or PCMCIA, cards for laptops), wireless access points, network interface cards, routers, servers, and many others. A network operating system manages communication over a network.

### 2. Local Area Networks (LANs)

*Local area networks* (LANs) permit shared resources (software, hardware, and data) among computers within a limited area. LANs are usually privately owned.

### 3. Wide Area Networks (WANs)

*Wide area networks* (WAN) allow national and international communication by usually employing nondedicated public communications channels (e.g. fiber optic, terrestrial microwave, or satellite) as their communications media.

#### a. Value-Added Networks (VANs)

*Value-added networks* (VANs) are privately-owned communications networks that provide enhanced data transmission services including enhanced security.

#### b. Internet-Based Networks

*Internet-based networks* use Internet protocols and public communications channels to establish network communications. Internet-based networks are used to establish communication among a company's LANs as well as to transmit EDI transactions. (Internet-based networks are cheaper than VANs and Internet transactions are transmitted faster than VAN-based transactions.)

#### c. Intranet and Extranets

*Intranets and extranets* use Internet protocols and public communications media rather than proprietary systems (so that Internet browsers can be used) to create a company-wide network.

##### (1) Intranet

An intranet is a connection of geographically separate local area networks (LANs) using common Internet protocols to link a company into a single network.

##### (2) Extranet

An extranet is the connection of outside users, such as suppliers, to a company's intranet.

#### 4. Wireless Networks

Many organizations provide wireless access to their information systems. The benefits are convenience and ease of use, but there are security risks associated with wireless networks. Industry standards provide security approaches based on the character of wireless connections.

## II. DATABASES/DATABASE MANAGEMENT SYSTEMS

Databases are not synonymous with database management systems (DBMS). A database represents a structure for data; a database management system serves as a tool for storage of data and data manipulation. There may be many databases running on the same DBMS.

### A. Databases

A database is an integrated collection of data records and data files that have a certain structure. It is comprised of nothing more than stored data and information. Types of databases are:

#### 1. Operational

Examples include customer and personnel databases.

#### 2. Analytical

Examples include summary data related to sales and the marketplace.

#### 3. Data Warehouses

Used for data mining for operational and management purposes, examples include collections of sales and inventory data from multiple years.

#### 4. Distributed

Distributed databases are physically distributed on local or remote hardware such as an intranet or the Internet. Databases may be distributed by partitioning them (storing different parts of the data in different places) or by replicating them (storing the same data in multiple places).

#### 5. End-User

Examples include databases on individual end-user workstations or PCs.

#### 6. Relational

A relational database is a two-dimensional data arrangement with records linked by keys. Most databases these days are relational databases although there are still a large number of large hierarchical databases.

### B. Database Management System (DBMS)

A database management system is not a database; it is a tool. The DBMS controls the development, use, and maintenance of the databases used by the organization. Large organizations normally have multiple databases and often different database management systems (developed at different times and still being used in production applications).

#### 1. Definitions

Computing begins with data and ends with information.

##### a. Data

Data represents raw facts without context. Software manipulates data to turn it into information.

##### (1) Bits and Bytes

Data is stored in bytes that normally have eight bits, each of which is a binary digit, either a 0 or a 1. Bytes are sometimes called octets.

**(2) Characters**

Bytes ultimately represent characters. Each character is alphabetic (abc), numeric (123), or a special character (such as commas and asterisks).

**(3) Fields**

Characters are organized into fields, such as an address.

**(4) Records**

Groups of fields are called records (e.g., an address list might include name, street, city and state information). Records are grouped into files.

**b. Information**

Information represents data that is organized in a meaningful and informative way.

**2. Major Uses of a DBMS**

The four main functions of DBMS are:

- a. Database development
- b. Database query
- c. Database maintenance
- d. Application development

**3. Advantages of a DBMS**

- a. Reduced data redundancy and inconsistency
- b. Data independence (the data is independent of the programs that process it)
- c. Increased data standardization
- d. Improved data security (most DBMS have their own built-in security systems)
- e. Improved data availability
- f. Direct access

**4. Disadvantages of a DBMS**

- a. The need for highly specialized personnel (database administrators are expensive)
- b. High cost of purchase and maintenance (maintenance always has to be considered)
- c. Possible obscuring of the audit trail
- d. Specialized backup and recovery procedures required

## NOTES



**MULTIPLE-CHOICE QUESTIONS****QUESTION 1**

Conroe Company is a brokerage and commodities trading firm with customers all over the U.S. and in many foreign countries. Conroe has a formal disaster recovery plan that has been approved by its Board of Directors. The plan consists of a contracted cold site across the street from its main office building; processing will be transferred to that cold site if a disaster occurs. Which of the following statements with respect to Conroe's disaster recovery plan is/are correct?

- I. Conroe must have its disaster recovery plan certified by its external auditors.
  - II. Conroe's disaster recovery plan is more than sufficient given the nature of its business and the fact that the probability of a disaster occurring is considered to be minimal by the Board of Directors.
  - III. Conroe's disaster plan does not need to be tested since it will be relatively simple to transfer its data and programs to the cold site since it is so close.
- 1. I only is correct.
  - 2. I and II only are correct.
  - 3. I and III only are correct.
  - 4. None of the statements are correct.

**QUESTION 2**

Lisa Company has an Information Technology department comprised of systems analysts, programmers, and operations personnel. It is considering implementing a database management system and obtaining the appropriate personnel to support that system. Which of the following statements is/are correct?

- I. Lisa will not need a database administrator because the database management system will need no maintenance or support.
  - II. Lisa will need a data administrator to apply system upgrades to the database management system.
  - III. Lisa will not need any additional special expertise at all. Its existing programmers will be able to handle maintenance and support of the database management system.
- 1. I only is correct.
  - 2. II only is correct.
  - 3. I and III only are correct.
  - 4. No statement above is correct.

**QUESTION 3**

Which of the following does not identify an appropriate type of backup?

- 1. Incremental.
- 2. Differential.
- 3. Half.
- 4. Full.

QUESTION 4

Daemon Company utilizes an intranet and an extranet in its computing environment. Which of the following statements is correct?

1. Daemon uses its intranet to communicate with its suppliers and customers.
2. Daemon uses its extranet to communicate with its employees scattered over the country.
3. Daemon uses the same browser with its intranet and its extranet.
4. Daemon uses a VAN for its intranet and extranet.

QUESTION 5

Travis Company utilizes B2B E-commerce for the acquisition of its inventory and wants to implement B2C E-commerce for its sales. Which of the following statements is/are incorrect?

- I. Travis cannot use B2B and B2C at the same time.
  - II. Travis can use B2B and B2C at the same time, provided it does not also use EDI.
  - III. Advantages of EDI are speed, timing, and personalization. There are no disadvantages.
1. I and II only are incorrect.
  2. I, II, and III are incorrect.
  3. I and III only are incorrect.
  4. II and III only are incorrect.

QUESTION 6

Easy Access Corporation gives its employees the ability to perform limited personnel functions on its Human Resources intranet website. Employees verify their paycheck amounts, and adjust income tax withholding information and other employee benefits data. The database that best describes this data and functionality is known as a:

1. Operational database.
2. Analytical database.
3. Data warehouse.
4. Relational database.

## TASK-BASED SIMULATIONS

TASK-BASED SIMULATION 1: *Written Communication*

Prime FL, Inc. is a Florida-based company currently working on its disaster recovery plan. John Gordon, the company controller, has been given a large budget for this project, but he is unclear whether a *cold*, *hot*, or *warm* site is the right decision for his environment. As the *Disaster Recovery Specialist*, draft a memo to John Gordon discussing the benefits of each site in order to assist him with his decision.

Type your communication in the response area below using the word processor provided.

**REMINDER:** Your response will be graded for both technical content and writing skills. Technical content will be evaluated for information that is helpful to the intended reader and clearly relevant to the issue. Writing skills will be evaluated for development, organization, and the appropriate expression of ideas in professional correspondence. Use a standard business memo or letter format with a clear beginning, middle, and end. Do not convey information in the form of a table, bullet point list, or other abbreviated presentation.

MEMORANDUM	
To:	John Gordon, Controller
Subject:	Backup Solution
<div style="border: 1px solid black; height: 20px; margin-bottom: 10px;"></div> <div style="margin-bottom: 10px;">[Response area]</div>	
<p>Sincerely,</p> <p><i>Disaster Recovery Specialist</i></p>	

TASK-BASED SIMULATION 1: *Solution*

## MEMORANDUM

To: John Gordon, Controller  
Subject: Backup Solution

The purpose of this memo is to provide you with information regarding *disaster recovery* offsite location options and how they would be advantageous to Prime FL, Inc.

Disaster recovery and offsite locations consist of plans for continuing operations in the event of destruction of program and data files, as well as processing capability. Small outages should be reestablished at the original site; however, you should plan for an offsite location should Prime FL not be available due to a disaster.

Along with the cost involved, in order to make the right decision on which site is correct for Prime FL, you will have to decide how urgently you will need to get your data, network, and users up and running.

A *hot site* is the most complete offsite option as well as the most costly. It would be fully equipped and would be ready to take over Prime FL's data processing in a matter of hours, as the backup copies of your essential data files would also be maintained at the same location. This would be the best option for a quicker recovery.

A *cold site* would have all the electrical connections and other physical requirements for data processing, but it would not have the actual equipment. Cold sites usually require one to three days to be made operational because equipment would have to be acquired. This would be the cheapest option for an offsite location.

A *warm site* is a combination between a *hot site* and a *cold site*. A *warm site* facility would already be stocked with all the hardware it takes to create a reasonable duplicate of what you have in your primary data center. The difference is that it would not maintain a copy of your data backup and it would have to be shipped to the offsite location. A restoration would be accomplished in a reasonable amount of time. Prime FL would still have a continued cost because a maintenance contract would have to be kept with the facility to keep hardware up-to-date.

In today's world, for a substantial organization not to have an offsite location as part of your disaster recovery plan is very risky. As budget does not seem to be an obstacle for Prime FL, Inc., I would suggest an implementation of a *hot site*.

I hope I have provided you with enough information to make an educated decision regarding which option would be best suited for Prime FL, Inc.

Sincerely,

*Disaster Recovery Specialist*

# BUSINESS 5 BUSINESS 2

*Economics I*

---

• Economic Measures/Indicators

• Changes in Economic and Business Cycles

• Fiscal and Monetary Policy

• Factors Affecting Equilibrium Price and Quantity

## **NOTES**

**I. ECONOMIC MEASURES/INDICATORS****A. Gross Domestic Product (GDP)**

GDP is the measurement tool of the output and performance of a nation's economy. It includes all final goods and services produced by resources within a country, regardless of what country owns the resources (emphasis is on the word "domestic").

**1. Two Methods of Measuring GDP****a. The Expenditure Approach (GICE)**

- (1) Government Purchases
- (2) Gross Domestic Investment
- (3) Personal Consumption
- (4) Net Exports

**b. The Income Approach (PAIDRITE)**

- (1) Corporate Profits
- (2) Adjustments for Net Foreign Income
- (3) Net Interest
- (4) Depreciation
- (5) Rental Income
- (6) Income of Proprietors
- (7) Indirect Business Taxes
- (8) Employee Compensation

**B. Other Measures of National Income****1. Gross National Product (GNP)**

GNP is the measurement tool of the market value of all final goods and services produced by residents of a country, regardless of whether or not the resident produces the goods or services domestically or abroad. Emphasis is on the word "national."

**2. Net National Product (NNP)**

NNP = GNP – Depreciation

**3. National Income (NI)**

NI = NNP – Indirect business taxes

**4. Personal Income (PI)**

Households and non-corporate businesses.

**5. Disposable Income (DI)**

DI = PI – Personal taxes

**C. Measuring Unemployment****1. The Unemployment Rate**

$$\text{Unemployment rate} = \frac{\text{Number of unemployed}}{\text{Total labor force}} \times 100$$

**2. The Labor Force**

Total labor force = All individuals 16 years of age and older who are either working or actively seeking work.

**3. Types of Unemployment**

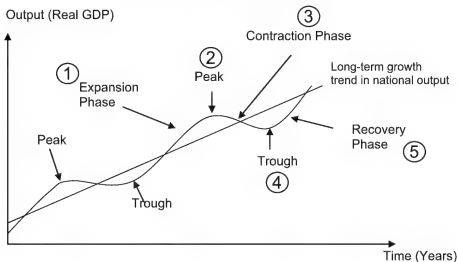
- Frictional Unemployment—Normal unemployment due to turnover, etc.
- Structural Unemployment—Jobs available do not match skills
- Seasonal Unemployment—Result from seasonal change
- Cyclical Unemployment—Result from business cycle
- Natural Rate of Unemployment: Frictional unemployment + Structural unemployment + Seasonal unemployment

**D. Inflation, Deflation and the Consumer Price Index**

- Inflation—Sustained increase in prices
- Deflation—Sustained decrease in prices
- The Consumer Price Index (CPI)**—measures the overall cost of a basket of goods and services typically consumed by households in a given period of time. The GDP Deflator measures the changes in prices of all new domestically produced final goods and services in an economy.

$$\text{Inflation rate} = \frac{\text{CPI}_{\text{this period}} - \text{CPI}_{\text{last period}}}{\text{CPI}_{\text{last period}}} \times 100$$

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP Deflator}} \times 100$$

**II. CHANGES IN ECONOMIC AND BUSINESS CYCLES****Components of the Business Cycle**



### III. FISCAL AND MONETARY POLICY

#### A. Effect of Government Fiscal Policy on the National Economy

##### 1. The Effect of Fiscal Policy on Real GDP and the Price Level

- a. Expansionary Fiscal Policy
- b. Contractionary Fiscal Policy

##### 2. The Effect of Fiscal Policy on Interest Rates and Firm Investment

Fiscal policy can affect firm investment through its effect on interest rates.

#### B. The Federal Reserve and Monetary Policy

##### 1. The Federal Reserve and Monetary Policy Tools—The Fed controls the money supply through:

- a. Open Market Operations—Buying and selling government securities.
- b. Changes in the Discount Rate—Interest rate for short-term loans to member banks.
- c. Changes in the Required Reserve Ratio—Fraction of bank reserves held in reserve.

#### C. The Effect of Monetary Policy on the National Economy

##### 1. The Money Supply and Interest Rates

###### a. Increase in Money Supply = Decrease in Interest Rates

- (1) Purchasing government securities,
- (2) Lowering the discount rate, or
- (3) Lowering the required reserve ratio.

###### b. Decrease in Money Supply = Increase in Interest Rates

- (1) Selling government securities,
- (2) Increasing the discount rate, or
- (3) Increasing the required reserve ratio.

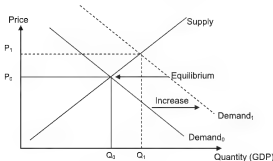
##### 2. Inflation, Recessions, and Changes in the Money Supply

- a. Stimulate Economy During a Recession
- b. Control of Inflation

#### IV. FACTORS AFFECTING EQUILIBRIUM PRICE AND QUANTITY

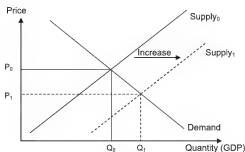
##### A. Equilibrium Cases

1. When the demand curve shifts right, equilibrium price and quantity will increase.
2. When the demand curve shifts left, equilibrium price and quantity will fall.
3. When the supply curve shifts right, equilibrium price will fall and equilibrium quantity will increase (i.e., more of the good will be produced and sold at a lower price).
4. When the supply curve shifts left, equilibrium price will increase and equilibrium quantity will fall.



If  $D \uparrow$ , then  $Q \uparrow$ ,  $GDP \uparrow$ ,  $P \uparrow$

If  $D \downarrow$ , then  $Q \downarrow$ ,  $GDP \downarrow$ ,  $P \downarrow$



If  $S \uparrow$ , then  $Q \uparrow$ ,  $GDP \uparrow$ ,  $P \downarrow$

If  $S \downarrow$ , then  $Q \downarrow$ ,  $GDP \downarrow$ ,  $P \uparrow$

##### B. Factors that Shift Aggregate Demand

1. Consumer Wealth
2. Real Interest Rates
3. Government Spending
4. Personal Taxes (Income Taxes)
5. Consumer and Firm Expectations about Future Economic Conditions
6. Exchange Rates

##### C. Factors that Shift Demand Curves

1. Income
  - a. Substitutes—Similar Goods
  - b. Complements—Goods that are used in tandem with other goods
2. Tastes or Preferences
3. Consumer Expectations
4. Changes in the Number of Buyers Served by the Market

##### D. Price Elasticity of Demand

$$\text{Price elasticity of demand} = \frac{\% \text{ Change in quantity demanded}}{\% \text{ Change in price}}$$

1. Inelastic Demand (Price Elasticity of Demand  $< 1.0$ )
2. Elastic Demand (Price Elasticity of Demand  $> 1.0$ )
3. Unit Elastic Demand (Price Elasticity of Demand  $= 1.0$ )

**MULTIPLE-CHOICE QUESTIONS****QUESTION 1**

Suppose that in a given year, a country has personal consumption of \$6,000, investment of \$2,000, government purchases of \$1,600, exports of \$600, imports of \$800, indirect business taxes of \$1,200, employee income of \$6,500, and depreciation of \$400. What is the country's GDP?

1. \$15,100
2. \$10,600
3. \$8,100
4. \$9,400

**QUESTION 2**

Suppose that in a given year, the nominal GDP of a country is \$10,000 billion and the GDP deflator is 125. What is real GDP for the country?

1. \$12,500 billion.
2. \$8,000 billion.
3. \$10,000 billion.
4. \$80 billion.

**QUESTION 3**

GNP differs from GDP because:

1. GNP includes the income earned by foreigners in the United States and excludes the income earned by U.S. citizens abroad.
2. GNP includes the income earned by U.S. citizens abroad but excludes the income earned by foreigners in the U.S.
3. GNP accounts for losses from depreciation.
4. GNP accounts for losses from depreciation and indirect business taxes.

**QUESTION 4**

Consider an economy with 1,000 people, 600 who hold jobs, 200 who are looking for work, 100 who have given up looking for a job, and 100 who are under the age of 16 or retired. The total labor force and unemployment rate, respectively, are:

1. 800, 25%
2. 900, 33%
3. 900, 22%
4. 800, 37.5%

**QUESTION 5**

The Consumer Price Index (CPI) is a measure of:

1. The overall cost of all goods and services produced in the domestic economy during a given time period.
2. The overall cost of a basket of goods and services typically consumed by households in a given time period.
3. The overall cost of resources (inputs) typically utilized by producers in a given time period.
4. The overall cost of all goods and services consumed by households in a given time period.

QUESTION 6

Which of the following correctly lists the order of the typical phases of a business cycle?

1. Expansion, contraction, trough, peak.
2. Expansion, peak, contraction, trough.
3. Trough, contraction, expansion, peak.
4. Contraction, expansion, peak, trough.

QUESTION 7

Inflation can be caused by a/an:

1. Increase in aggregate supply and/or an increase in aggregate demand.
2. Decrease in aggregate supply and/or an increase in aggregate demand.
3. Decrease in aggregate supply and/or a decrease in aggregate demand.
4. Increase in aggregate supply and/or a decrease in aggregate demand.

QUESTION 8

If the Federal Reserve wanted to increase the money supply, it could:

1. Increase the required reserve ratio and/or decrease the discount rate.
2. Decrease the discount rate and/or purchase government securities.
3. Decrease the required reserve ratio and/or sell government securities.
4. Increase the discount rate and/or purchase government securities.

# BUSINESS 6A

## BUSINESS 6A

*Economics 2*

---

- Globalization and Local Economies

- Market Structures

- Developing and Implementing Strategy

- Supply Chain Management (SCM)

- Financial Risk Management

- Circumstances Creating Exchange Rate Fluctuations

- Risk Exposures Implied by Exchange Rate Fluctuations

- Hedging Arrangements to Mitigate Exchange Rate Fluctuations

- Risk Mitigation: Other Financial Risk Management Techniques

## NOTES

## SUMMARY NOTES

## I. GLOBALIZATION AND LOCAL ECONOMIES

## A. Impact of Globalization on Companies

1. Deeper integration with the world's economies.
2. Increased specialization.

## B. Shifts in Economic Balance of Power

1. Unipolar distributions of power anticipate the United States as the only superpower.
2. Economic growth of emerging nations such as Brazil, Russia, India and China (BRIC) will shift the balance of power and introduce a multipolar distribution of power.
3. Functional interdependence of nations (participation in worldwide institutions such as the World Trade Organization and United Nations) provides the opportunity to effectively address the risks associated with systemic interdependence (climate change and nuclear proliferation).
4. Cooperative rather than competitive strategies will likely produce a sustainable globalized economy.

## II. MARKET STRUCTURES

Market structure refers to the type of market within which firms operate.

## A. Perfect Competition

1. A large number of firms,
2. Very little product differentiation, and
3. No barriers to entry.

## B. Monopolistic Competition

1. A relatively large number of firms,
2. **Differentiated** products sold by the firms in the market (i.e., each firm sells a slightly different product than its competitors),
3. Few barriers to entry, and
4. Significant non-price competition in the market.

## C. Oligopoly

1. **Very few firms** selling differentiated products,
2. Fairly significant barriers to entry,
3. Firms are interdependent (i.e., the actions of one firm affect the actions of other firms), and
4. Firms face kinked demand curves (match price cuts; ignore price increases).

## D. Monopoly

1. A **single firm** in a market,
2. Significant barriers to entry,
3. The ability of a firm to set output and prices, and
4. No substitute products for the good.

### III. DEVELOPING AND IMPLEMENTING STRATEGY

#### A. Factors that Influence Strategy (SWOT)

1. Internal Factors (Strengths and Weaknesses)
2. External Factors (Opportunities and Threats)

#### B. Types of Competitive Strategies

1. **Cost Leadership Strategies**
  - a. Broad range of buyers
  - b. Narrow range (niche) of buyers
2. **Differentiation Strategies**
  - a. Broad range of buyers
  - b. Narrow range (niche) of buyers
3. **Best Cost Strategies**
4. **Other Strategies**
  - a. Vertical Integration
  - b. Merger and Acquisition
  - c. Cooperative/Strategic Alliances

#### C. Value Chain Analysis

1. **Part of Strategic Planning**
  - a. Helps a company meet or exceed customer expectations
2. **Types of Value Chain Analysis**
  - a. Internal Costs Analysis
  - b. Internal Differentiation Analysis
  - c. Vertical Linkage Analysis
3. **Steps in Value Chain Analysis**
  - a. Identify the value chain **activities**.
  - b. Identify the **cost drivers** associated with each activity.
  - c. Develop competitive advantage by either:
    - (1) **Reducing cost** or
    - (2) **Adding value**.



#### **4. Strategic Frameworks in Value Chain Analysis**

##### **a. Industry Structure**

Michael Porter identified the five forces that assist a firm in determining what makes one firm more profitable than another.

- (1) Barriers to Market Entry
- (2) Market Competitiveness
- (3) Existence of Substitute Products
- (4) Bargaining Power of Customers
- (5) Bargaining Power of Suppliers

#### **IV. SUPPLY CHAIN MANAGEMENT (SCM)**

##### **A. Supply Chain Operations Reference (SCOR) Model**

1. Plan
2. Source
3. Make
4. Deliver

##### **B. Benefits of Supply Chain Management**

1. Reduced inventory, warehousing, and packaging costs.
2. Reduction of delivery and transportation costs.
3. Improved service and delivery times.
4. Management and integration of suppliers.
5. Cross-docking (minimization of handling and storage costs).

## V. FINANCIAL RISK MANAGEMENT

### A. Risk Definitions: Exposures to Loss

1. **Market risk:** losses in trading value of asset or liability in markets.
2. **Interest rate risk:** losses in underlying asset value or increases in underlying liability value as a result of changes in market interest rates.
3. **Default risk:** the possibility that a debtor may not repay the principal or interest due on their debt obligation.
4. **Credit risk:** inability to secure debt financing in a timely and affordable manner.
5. **Exchange rate risk and other international exposures.**

## VI. CIRCUMSTANCES CREATING EXCHANGE RATE FLUCTUATIONS

Exchange rate fluctuations are generally caused by two general factors:

### A. Trade Factors

1. Inflation Rates
2. Income Levels
3. Governmental Controls

### B. Financial Factors

1. Interest Rates
2. Capital Flows

## VII. RISK EXPOSURES IMPLIED BY EXCHANGE RATE FLUCTUATIONS

### A. Transaction Exposure

Dealing in foreign currencies exposes the parties involved to potential economic loss or gain upon settlement of a transaction in a foreign currency. (Note: This is either a purchase transaction resulting in a payable or a sales transaction resulting in a receivable.)

### B. Economic Exposure

Exposure to economic risks related to exchange rate fluctuations pertains to the possibility that the value of cash flows could fluctuate up or down as a result of changes in the exchange rate.

The following diagram summarizes the relationship.

Assume: at time<sub>0</sub> → \$1 = 1€

	Receive € (Net inflows)	Paying € (Net outflows)
If U.S. \$ appreciates to \$0.75 = 1€ →	❶ Loss	❷ Gain
If U.S. \$ depreciates to \$1.25 = 1€ →	❸ Gain	❹ Loss

### Example

- Company A has a 100€ receivable. The U.S. \$ appreciates from \$1 = 1€ to \$0.75 = 1€. Originally, once this 100€ was received, it could be converted to \$100 at the initial exchange rate. But, when the U.S. \$ appreciates, the same 100€ receivable can only be converted to \$75 (loss).
- If Company A had a payable of 100€, originally it cost \$100. But, when the U.S. \$ appreciates, the same 100€ payable can be satisfied with \$75 (gain).
- If Company A has a 100€ receivable and the U.S. \$ depreciates from \$1 = 1€ to \$1.25 = 1€, once the 100€ is received, it can be converted to 100€ = \$125 (gain).
- If Company A has a 100€ payable and the U.S. \$ depreciates, to satisfy the 100€ payable, it requires \$125 instead of \$100 (loss).

### C. Translation Exposure

The potential that the consolidation of the financial statements of domestic parents with foreign subsidiaries will result in changes in account balances and income as a result of exchange rate fluctuations is referred to as translation exposure. From an accounting standpoint, translation exposure reduces both translation gains and losses (reported in other comprehensive income) and remeasurement gains and losses (reported in income). Translation exposure is also known as accounting exposure.

## VIII. HEDGING ARRANGEMENTS TO MITIGATE EXCHANGE RATE FLUCTUATIONS

### A. Transaction Exposure Hedges

#### 1. Futures Hedge

A futures hedge entitles the holder to either purchase or sell a number of currency units for a negotiated price on a stated date. Futures hedges are used for smaller amounts.

#### 2. Forward Hedge

A forward hedge is similar to a futures hedge, but the owner of the contract is entitled to buy or sell volumes of currency at a point in time. Forward contracts identify groups of transactions for larger amounts.

#### 3. Money Market Hedge

Money market hedges use foreign money markets to meet future cash flow needs and mitigate exchange rate risks by investment in financial institutions of the foreign economy. Money market hedges may be executed with either excess cash discounted and invested in the foreign economy or through simultaneous borrowing and reinvesting in the foreign economy.

#### 4. Currency Option Hedge

Currency option hedges use the same principles as forward hedge contracts and money market hedge transactions, except the owner has the option (and not the obligation) to execute the hedge transaction. The acquisition of an option requires payment of consideration (a premium). The owner of the option must consider the cost of the premium as part of determining the value of exercising the option.

### B. Economic and Translation Exposure Hedges: Restructuring

Economic and translation exposure to exchange rate fluctuations involves overall business planning and design which create potential exposures to cash flow (economic) or financial reporting (translation) risks related to exchange rate fluctuation.

## IX. RISK MITIGATION: OTHER FINANCIAL RISK MANAGEMENT TECHNIQUES

### A. Diversification

- Investment in a variety of asset classes that will behave differently with changes in markets, interest rates, etc.
- Some risks are non-diversifiable (systematic risks)

### B. Reducing Foreign Taxation Through Transfer Pricing

The primary reason for developing transfer pricing arrangements between domestic parents and foreign subsidiaries is to minimize local taxation.

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**MULTIPLE-CHOICE QUESTIONS**

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**QUESTION 1**

In a perfectly competitive market, firms are likely to:

1. Devote significant resources to promote product differentiation.
2. Face significant barriers to market entry.
3. Match price cuts by competitors but ignore price increases.
4. None of the above.

**QUESTION 2**

In a monopolistically competitive market, firms have some market power because:

1. There are few firms operating in the market.
2. There is only one firm in the market.
3. There are significant barriers to market entry.
4. Firms sell differentiated products.

**QUESTION 3**

Canal Corporation is considering value chain analysis. Which of the following statements is/are correct with respect to value chain analysis?

- I. Value chain analysis is a tool used by companies to assess the perceived value of a company by potential stockholders.
  - II. Value chain analysis starts with an identification of cost drivers and ends with the development of means of obtaining competitive advantage.
  - III. Types of value chain analysis are internal cost analysis, internal differentiation analysis, and vertical linkage analysis, all of which examine internal costs to determine perceived value and competitive advantage.
1. I, II, and III are correct.
  2. II only is correct.
  3. I and III only are correct.
  4. None of the listed choices are correct.

**QUESTION 4**

Louise Foo Foo Cosmetics markets a line of makeup that features a range of products for women with normal skin types. Various product lines of skin care and makeup are marketed in various volume retail outlets and drug store chains and also through online buying. The company features a virtual makeover website for demonstration of the impact of product selections on hair color and skin type using a personally scanned picture. The product is not found in boutiques or discount stores. The competitive strategy that best describes Louise Foo Foo Cosmetics is:

1. Best cost strategy.
2. Cost leadership focused on a market niche.
3. Cost leadership focused on a broad range of buyers.
4. Differentiation focused on a market niche.

## QUESTION 5

Hickman International is based in the United States, but it conducts significant business in Canada. The company's exposure to economic risks of exchange rate fluctuation include:

1. The potential that accounts receivable denominated in Canadian dollars may be exchanged for fewer United States dollars at the settlement date than on the date of origination.
2. The potential that net sales in Canadian markets (inflows) are denominated in a devalued currency that is less valuable than the United States dollar thereby reducing the present value of the company.
3. The potential that the remeasurement of subsidiary financial statements denominated in Canadian dollars may produce a foreign exchange loss.
4. The potential that translated financial statements might reflect a reduction in comprehensive income.

## QUESTION 6

Siaggas International is a United States corporation with substantial dealings in Europe. The company is hedging the amounts it owes on individual accounts payable denominated in euros. The financial instrument most likely used by the company would be:

1. Futures contracts to buy the specific number of euros to settle the debt at the spot rate at the time the liability was incurred.
2. Futures contracts to sell the specific number of euros to settle the debt at the spot rate at the time the liability was incurred.
3. Forward contracts to buy the monthly requirement of euros to satisfy anticipated accounts payable for the month.
4. Forward contracts to sell the monthly requirement of euros to satisfy anticipated accounts payable for the month.

## QUESTION 7

Occidental Olinto is a United States company that trades extensively in Europe. The company has receivables denominated in 100,000 euros due in 90 days. The company has accounts payable that it owes today and has no excess cash. The current spot rate is \$1.25 to 1.00 euro, and the European short-term interest rates are 5 percent. Occidental Olinto would be able to use a money market hedge to immediately obtain which of the following amounts of United States dollars to liquidate payables?

1. \$79,072
2. \$98,765
3. \$123,456
4. \$125,000

## TASK-BASED SIMULATIONS

TASK-BASED SIMULATION: *Written Communication*

The owner of a private school is trying to increase its revenues to meet rising costs. Capacity is limited and you have been asked to comment on the ways in which revenue can be increased.

Prepare a memorandum to the owner describing why pure price increases may result in increased revenue.

Type your communication in the response area below using the word processor provided.

**REMINDER:** Your response will be graded for both technical content and writing skills. Technical content will be evaluated for information that is helpful to the intended reader and clearly relevant to the issue. Writing skills will be evaluated for development, organization, and the appropriate expression of ideas in professional correspondence. Use a standard business memo or letter format with a clear beginning, middle, and end. Do not convey information in the form of a table, bullet point list, or other abbreviated presentation.

## MEMORANDUM

To: Private School Owner

Subject: Price Increases

[Response area]

Sincerely,

Accountant

TASK-BASED SIMULATION: *Solution*

## MEMORANDUM

To: Private School Owner

Subject: Price Increases

Increasing tuition may be a highly effective method of increasing revenue. Although increases in tuition may result in decreased enrollment, if the percentage increase in revenue exceeds the percentage decrease in enrollment, total revenue will increase.

The inelasticity of demand (the idea that demand will remain relatively unchanged in responses to changes in price) is generally equated with essential items for survival like water, or food or even fuel. However the quality of education of our children has a strong perceived value to the families already enrolled. Clearly the families you serve have elected to use your school rather than to rely on public schools that are "free."

As you review your strategy for the coming year, recognize you are electing to differentiate yourself from the competition as a premier choice in education that is worth the price, not as a cost leader that undersells other options.

Revenue can increase purely based on tuition increases but you will need to insure that the demand for your school's service is differentiated from the competition and remains an alternative that cannot be duplicated by your competition.

Let me know if you need further assistance on this issue.

Sincerely,

*Accountant*



# BUSINESS 6B

## BUSINESS 6B

*Additional BEC Topics*

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- Process Management
- Project Planning, Implementation, and Monitoring
  - Methods of Short-Term Financing
  - Methods of Long-Term Financing
  - Financial Valuation

## NOTES

**I. PROCESS MANAGEMENT****A. Approaches, Techniques, Measures, and Benefits to Process-Management-Driven Businesses**

Business process management is also known as BPM and promotes continuous improvement in business processes.

There are many generic BPM methodologies, but the most recognized method is Plan, Do, Check, Act (PDCA).

Benefits of process management include improved efficiency, effectiveness, and agility for the organization.

**B. Roles of Shared Services, Outsourcing, and Offshore Operations, and their Implications for Business Risks and Controls**

Shared services represent consolidation of redundant services in an organization or group of affiliates. Financial efficiencies may be overshadowed by ineffective results.

Outsourcing services represent contracting with others to provide a service. Outsourcing involves a third party and shared services represent an "in-house" solution. Lost control and lost institutional knowledge head the list of risks for outsourcing.

Offshore operations generally contemplate outsourcing out of the country. All outsourcing risks plus potential quality issues and language barriers are potential risks.

**C. Selecting and Implementing Improvement Initiatives**

1. Project improvement initiatives may be selected for emotional or rational reasons.
2. Implementation is a project management function (described below).

**3. Benchmarking**

Benchmarking is the process of identifying standards for critical success factors used in comparison to actual performance. Ultimately, benchmark standards are designed to identify areas needing improvement and stimulate adjustments that will produce results that meet or exceed the benchmark.

**4. Best Practices**

Externally determined benchmarks are typically best practices, which represent world-class performance standards.

**D. Business Process Reengineering**

1. Business process reengineering (BPR) seeks radical change by entirely changing the design and operation of business processes.
2. BPR is different from BPM. BPM seeks incremental rather than radical changes.

**E. Management Philosophies and Techniques for Performance Improvement****1. Just-in-Time (JIT)**

The concept of Just-in-Time (JIT) inventory systems is that resources will be introduced to the manufacturing process only as they are needed. An item is produced only when it is requested further downstream in the production cycle. JIT systems serve to make organizations more efficient and better managed and also produce greater profits. **JIT assumes zero defects.**

**2. Quality Control**

Quality is broadly defined by the marketplace as a product's ability to meet or exceed customer expectations. The cost of quality is classified into two components: conformance costs and nonconformance costs.

**3. Quality Control—Conformance Costs**

Costs of ensuring conformance with quality standards are classified as either prevention costs or appraisal costs.

**a. Prevention Costs**

Prevention costs are costs incurred to prevent the production of defective units. Examples include employee training, inspection, redesigning product and processes, searching for higher-quality suppliers, and engineering.

**b. Appraisal Costs**

Appraisal costs are costs incurred to discover and remove defective parts before they are shipped to the customer or the next department. Examples include statistical quality checks, testing, and inspection.

**4. Quality Control—Nonconformance Costs**

The costs of dealing with quality-standard nonconformance are classified as either internal failures or external failures.

**a. Internal Failure Costs**

Internal failure costs are necessary to cure a defect discovered before the product is sent to the customer. Examples include rework labor costs, scrap, tooling changes, disposal costs, cost of a lost unit, and downtime.

**b. External Failure Costs**

External failure costs are necessary to cure a defect discovered after the product is sent to the customer. Examples include warranty costs, costs for returning the good, liability claims, lost customers, and reengineering.

**5. Lean**

Lean seeks to reduce waste by concentrating on efficiency and adding value to the production process.

**6. Continuous Improvement—Kaizen**

Kaizen is synonymous with continuous improvement efforts that improve the efficiency and effectiveness of organizations through greater operational control. Kaizen occurs at the manufacturing stage where the ongoing search for cost reductions takes the form of analysis of production processes to ensure that resource uses stay within target costs.

**7. Demand Flow**

Demand flow seeks to reduce waste by bringing resources into production as they are demanded rather than as they are scheduled for production. Demand flow blends the efficiencies of JIT with the effectiveness (customer-focused, value-added) goals of Lean.

## 8. Theory of Constraints

Theory of constraints (TOC) anticipates that organizations are impeded from achieving objectives by the existence of one or more constraints. The organization or project must be consistently operated in a manner that either works around or leverages the constraint. *There are five steps to applying TOC:*

- a. Identification of the constraint
- b. Exploitation of the constraint
- c. Subordinate everything else to the above decisions
- d. Elevate the constraint
- e. Return to the first step

## 9. Six Sigma

Six sigma recommends the use of rigorous metrics in the evaluation of goal achievement and logically anticipates methodologies to improve current processes and develop new processes.

- a. *Existing product and business process improvements (DMAIC)*
  - (1) Define the problem
  - (2) Measure key aspects of current process
  - (3) Analyze data
  - (4) Improve or optimize current processes
  - (5) Control
- b. *New product or business process development (DMADV)*
  - (1) Define design goals
  - (2) Measure CTQ (Critical to Quality issues)
  - (3) Analyze design alternatives
  - (4) Design optimization
  - (5) Verify the design

## II. PROJECT PLANNING, IMPLEMENTATION, AND MONITORING

A project is a temporary undertaking intended to produce a unique service, product, or result.

Project management consists of five major processes carried out by a project manager tasked with balancing the needs and expectations of various stakeholders against the organization's constraints. The five major processes consist of authorization, planning, implementation, monitoring, and closing.

### A. Project Phases

#### 1. Planning

Projects begin with a Project Charter that contains a business justification for project objectives.

Planning involves all the activities necessary to determine the scope of the project, refine the project objectives, and define the course of action required to attain the project objectives.

Planning is ongoing throughout the life of the project.

## 2. Implementation

Implementation represents the activities that are associated with completing the work that has been specified in the project plan and producing the deliverables.

## 3. Monitoring

Monitoring and controlling consists of procedures performed to observe project execution.

### B. Roles of Project Team Members

#### 1. Project managers

The project manager is responsible for project administration on a day-to-day basis.

#### 2. Project members

Project members perform the project tasks.

#### 3. Oversight or steering groups

An individual at the executive level of management who is responsible for allocating funding and resources to the project.

### C. Project Risks

Risk is the chance that something will go wrong with a project.

Risk is inherent in every aspect of the project management process. The project manager must consider what could go wrong in the authorization, planning, execution, monitoring and control, and closing processes.

#### 1. Resources

The project manager must put together staff to work on the project and assign each team member responsibility for tasks.

The *Human Resource Plan* formally documents these planning assumptions.

#### 2. Scope

Product scope must define the attributes of the product, service, or result.

Project scope defines the work that must take place to produce the product, service, or result defined in the product scope. It can also describe work that is specifically excluded from the project.

A *Scope Baseline* is the formal written statement describing both the end product (product scope) and the project scope.

#### 3. Cost

The cost baseline represents the amount of money that is expected to be spent on a project.

When graphed, the cost baseline generally represents an S curve because little money is spent at the beginning and the end of a project.

The maximum expenditure of money generally occurs during the middle of the project.

#### 4. Deliverables

Quality of deliverables may be identified by the mnemonic **SMART**:

- Specific:** Clearly defined and precise.
- Measurable:** Criteria must be objective (e.g., not "new computers," but "computers with 2GB of memory," etc.).

- c. **Attainable:** Realistically achievable results (don't ask for the impossible).
- d. **Relevant:** Deliverable must correlate to the project objective (is the criterion actually related to the aim of the project?).
- e. **Time-based:** Has sufficient time been allowed? Is there enough time to achieve this? There is no point expecting a year's worth of work in one week.

### III. METHODS OF SHORT-TERM FINANCING

#### A. Working Capital Financing

*Working capital financing* entails current assets being financed with trade accounts payable and accrued liabilities.

#### B. Letter of Credit

A *letter of credit* is a third-party guarantee (e.g., a bank).

#### C. Line of Credit

A *line of credit* is a revolving line of short-term borrowing with a financial institution.

#### D. Fixed and Variable Loan Rates

*Fixed rates* remain constant; *variable* rates fluctuate.

### IV. METHODS OF LONG-TERM FINANCING

#### A. Leasing Options

##### 1. Operating Leases

*Operating leases* are often referred to as "**off-balance-sheet financing**" (because there is no balance sheet impact for the lessee). An operating lease agreement is a pure rental agreement, in which there is no change of ownership. Operating leases are ideal for lessees who have uncertain future cash flows.

##### 2. Capital Leases

*Capital leases* transfer "**substantially all**" of the risks and benefits of ownership associated with the lease to the lessee. The lessee records both an asset and a liability. Capital leases are ideal for a lessee whose financial position will not allow for conventional financing.

#### B. Debentures and Bonds

*Bonds* are a form of indebtedness that obligate the borrower to pay an agreed coupon payment over a period of years. *Debenture* bonds are unsecured and backed by the full faith and credit of the issuer.

#### C. Equity Financing

##### 1. Preferred Stock

*Preferred stock* is "preferred over common stock" as to liquidation and dividends, but it does NOT have voting rights.

##### 2. Common Stock

*Common stock* is a basic ownership security. Common shareholders have the final residual claim on assets upon liquidation.

## V. FINANCIAL VALUATION

Traditional financial valuation is based on the formula for the present value of an annuity. The formula is somewhat complex, but is applied in various forms through the financial management topic. Alternative valuation methods use variations of the Price Earnings (P/E) ratio. It is important to understand the valuation formulas, the implied assumptions of the formulas, and the impact of the behavior of financial managers on the evaluation of those assumptions.

### A. Calculating the Present Value of an Annuity

#### 1. Formula

$$\begin{aligned}\text{Annuity present value} &= C \times (1 - \text{Present value factor} / r) \\ &= C \times (1 - [1 / (1 + r)^t] / r)\end{aligned}$$

*Terms are defined as follows:*

- C = Cash flow annuity
- r = Rate of return
- t = Number of years

#### 2. Assumptions

Key assumptions include:

- The recurring amount of the annuity.
- The appropriate discount rate.
- The duration of the annuity.
- The timing of the annuity.

### B. Perpetuities (Zero Growth Stock)

When a company is expected to pay the same dividend each period, the perpetuity formula can be used to determine the value of the company's stock.

#### 1. Per Share Valuation

$$\text{Present Value of a Perpetuity} = \text{Stock Value Per Share} = P = D/R$$

*Terms are defined as follows:*

- P = Price
- D = Dividend
- R = Required return.

#### 2. Assumptions

Key assumptions include:

- The dividend (and assume it will never change).
- The required return.
- The formula implies that the stock price will not increase because the dividend does not increase.



**C. Constant Growth (Dividend Discount Model)**

If dividends are assumed to grow at a constant rate, the Gordon (constant) growth model can be used to determine the value of the company's stock.

**1. Per Share Valuation with Assumed Growth**

$$\text{Stock Value per Share with Assumed Growth} = P_t = D_{(t+1)} / (R - G)$$

*Terms are defined as follows:*

$P_t$  = Current price (price at period "t")

$D_{(t+1)}$  = Dividend one year after period "t"

$R$  = Required return

$G$  = Growth rate

**2. Assumptions**

Key assumptions include:

- The calculation of dividends one year beyond the year in which you are determining the price.
- A required rate of return.
- A constant dividend growth rate.
- The formula implies that the stock price will grow at the same rate as the dividend, which is not unreasonable, especially for a mature company.

**D. Alternative Approaches—P/E Ratio**

The P/E ratio, once calculated, can be applied to anticipated future earnings in order to determine the current stock price. It requires that earnings be greater than zero.

$$P/E \text{ Ratio} = P_0 / E_1$$

*Terms are defined as follows:*

$P_0$  = Price or value today

$E_1$  = Expected earnings in one year

**E. Alternative Approaches—PEG Ratio**

$$\text{Value of equity } (P_0) = PEG \times E_1 \times G$$

$$PEG = [(P_0 / E_1) / G] \times E_1 \times G$$

*Terms are defined as follows:*

$P_0$  = Price or value today

$E_1$  = Expected earnings in one year

$G$  = Growth rate =  $100 \times \text{Expected growth rate}$

**F. Alternative Approaches—Price to Sales Ratio**

$$\text{Value of equity } (P_0) = P_0 / S_1 \times S_1$$

*Terms are defined as follows:*

$P_0$  = Price or value today

$S_1$  = Expected sales in one year

## **G. Assumptions**

Price multiple ratios have similar assumption requirements including:

1. Future earnings
2. Future growth rate
3. Future sales
4. Duration of sales or earnings trends

## **H. Behavioral Influences**

Forecasting has numerous subjective elements that are subject to behavioral influences. These influences generally include:

### **1. Generalized Rules of Thumb**

*Generalized rules of thumb* distort objective evaluation of evidence.

- a. Tendency to use stereotyped characterizations.
- b. Use adjustments from presumed baselines.
- c. Use of intuition rather than analysis.

### **2. Biases**

- a. Excessive optimism
- b. Overconfidence bias
- c. Overconfidence
- d. Illusion of control

### **3. Context**

- a. Losses are more distracting than gains.
- b. Managers are generally averse to sure losses.

## MULTIPLE-CHOICE QUESTIONS

### QUESTION 1

Six Sigma is a continuous quality improvement methodology that is designed to promote:

1. Improvements for existing products and business processes.
2. Development of new products or business processes.
3. Both existing product/process improvement and new product process development.
4. Statistical evaluation of critical success factors.

### QUESTION 2

Rector Corporation is examining its quality control program. Which of the following statements is/are correct?

- I. Rework costs should be regarded as a cost of quality when the rework is caused by internal failure.
  - II. Prevention costs are costs that are incurred to prevent the sale and production of defective units.
  - III. Internal failure costs are costs of failure of machinery on the production line.
1. I, II, and III are correct.
  2. II only is correct.
  3. I and III only are correct.
  4. I only is correct.

### QUESTION 3

The scope of a project:

1. Does not change after the project charter has been approved.
2. Is affected by change control procedures during the closing stage.
3. Must be actively monitored and controlled throughout the project.
4. Is not the responsibility of a project manager.

### QUESTION 4

Cash Burn Enterprises is entering a period of intense cash utilization. The company is apprehensive about cash flow timing and ensuring consistent cooperation of its vendors to provide needed supplies. Management would likely use what short-term financing instruments or strategies to meet this challenge:

1. Letter of credit.
2. Line of credit.
3. Subordinated debentures.
4. Working capital financing.

QUESTION 5

Trade creditors are seeking guarantees that the Duffy Corporation will be able to pay its accounts payable. Trade creditors would likely require that Duffy Corporation obtain a(n):

1. Annual audit with disclosures regarding compliance with debt covenants.
2. Letter of credit.
3. Line of credit.
4. Compensating balance agreement.

QUESTION 6

Financial decisions are often influenced by behavioral factors. Which of the following is generally considered most distracting:

1. Overconfidence.
2. Business losses.
3. Use of available data.
4. Excessive optimism.